



COLLEGE OF HEALTH SCIENCES

SCHOOL OF PUBLIC HEALTH

DEPARTMENT OF PUBLIC HEALTH NUTRITION AND DIETETICS

MINIMUM MEAL FREQUENCY AND ITS ASSOCIATION WITH UNDERWEIGHT AMONG
NON-BREASTFED INFANTS AND YOUNG CHILDREN AGED 6 TO 23 MONTHS IN HAWASSA
CITY, ETHIOPIA.

BY: LIDETASH WOLDE (BSC)

ADVISORS' NAME

1. PRIMARY: SOLOMON SHIFERAW (MD, MPH, PHD)

2. SECONDARY: ROBEL YIRGU (BSC, MPH, PHD)

A THESIS SUBMITTED TO THE GRADUATE PROGRAM OF ADDISABABA, UNIVERSITY
COLLEGE OF HEALTH SCIENCES, SCHOOL OF PUBLIC HEALTH IN PARTIAL FULFILLMENT
FOR THE DEGREE OF MASTERS OF PUBLIC HEALTH IN PUBLIC HEALTH NUTRITION

JULY, 2025

ADDIS ABABA, ETHIOPIA

APPROVED BY THE BOARD OF EXAMINERS

This thesis, by Lidetash Wolde is accepted in its present form by the board of examiners as fulfilling thesis requirement for the degree of master in public health nutrition.

Advisor

<u>Solomon Shiferaw(PhD)</u>	<u>Associate Prof.</u>	<u></u>	<u>26/07/25</u>
Full name	Rank	Signature	Date

External Examiner

<u>Tsegaye Demissie (PhD)</u>	<u>Assoc. Prof.</u>	<u></u>	<u>20/07/25</u>
Full name	Rank	Signature	Date

Internal Examiner

<u>Samson Gebremedin</u>	<u>Associate Prof</u>	<u></u>	<u>26/07/2025</u>
Full name	Rank		Date

Chairman, Department Graduate committee

<u></u>	<u></u>	<u></u>	<u></u>
Full name	Rank	Signature	Date

Acknowledgements

First, I would like to send my heart felt gratitude to Addis Ababa University College of Health Sciences School of Public Health for giving me this great opportunity to finalize my thesis work. Secondly, I am grateful to show my greatest respect and gratitude to my advisors; Dr. Solomon Shiferaw (PhD) and Dr. Robel Yirgu (PhD) for their support and mentoring during my work. Thirdly, I would like to express my gratitude to Hawassa city Health bureau and each Sub-city health bureaus for providing me their permissions to conduct the research. Last but not least, I want to express my deepest gratitude to all of my family members and friends for their continuous support and encouragement during challenging times.

Table of Contents

Acknowledgements.....	ii
List of Tables	vi
List of figures.....	vii
List of Acronyms	viii
Abstract.....	ix
1. Introduction.....	1
1.1. Background	1
1.2. Statement of problem	2
1.3. Rationale of the study.....	4
1.4. Significance of the study.....	4
2. Literature Review.....	5
2.1. Underweight.....	5
2.1.1 Overview of underweight or weight-for-age.....	5
2.1.2. Causes and risk factors associated with underweight.....	6
2.2. Minimum meal frequency (MMF)	7
2.2.1 Definition and magnitude of minimum meal frequency	7
2.3. Underweight and its association with minimum meal frequency	7
2.4. Controversies on the association between underweight and minimum meal frequency.....	8
The Conceptual Framework.....	10
3. Objectives of the Study	11
3.1. General Objective.....	11
3.2. S pecific Objectives.....	11
4. Methods and Materials.....	12
4.1. Study Area and Period.....	12
4.2. Study Design	12
4.3. Population.....	12

4.3.1. Source Population.....	12
4.3.2. Study Population.....	12
4.3.3. Inclusion Criteria	12
4.3.4. Exclusion Criteria	12
4.4. Sample Size Determination.....	13
4.5. Sampling Procedure	13
4.6. Variables of the Study	15
4.6.1. Dependent Variable	15
4.6.2. Independent Variables	15
4.7. Data Collection Procedures.....	16
4.8. Operational Definitions.....	16
4.9. Data Management	17
4.10. Data Analysis Procedure	17
4.11. Data Quality Assurance.....	17
4.12. Ethical Consideration	18
4.13. Dissemination of Results.....	18
5. Results.....	19
5.1. Socio-demographic and economic characteristics	19
5.2. Underlying causes of underweight.....	21
5.3. Immediate causes of underweight	22
5.4 Association between minimum meal frequency and underweight among non-breastfed infants and young children.....	24
6. Discussion.....	26
7. Strengths and limitations of the study	29
7.1. Strengths:.....	29
7.2. Limitations:	29
8. Conclusions	30

5. Recommendations	31
6. References	32
11. Annexes.....	37

List of Tables

Table 1: Socio-demographic and economic characteristics of the study participants in Hawassa City, Ethiopia, 2024 (n=420).....	19
Table 2: The underlying causes of underweight among non-breastfed infants and young children aged 6–23 months in Hawassa City, Ethiopia, 2024 (n=420)	21
Table 3: Immediate causes of underweight among non-breastfed infants and young children aged 6–23 months in Hawassa City, Ethiopia, 2024 (n=420)	22
Table 4: Binary logistic regression for association between minimum meal frequency and underweight among non-breastfed infants and young children aged 6–23 months in Hawassa City, Ethiopia, 2024 (n=420).....	24

List of figures

<i>Figure 1: A conceptual framework for minimum meal frequency and its association with underweight among infants and young children aged 6 to 23 months in Hawassa City, Ethiopia, developed from the different literature (36, 37, 50-54).....</i>	<i>10</i>
<i>Figure 2: Sampling procedure for minimum meal frequency and its association with underweight among non-breastfed children aged 6 to 23 months in Hawassa City, Ethiopia, 2024.</i>	<i>15</i>
<i>Figure 3: Underweight status distribution among non-breastfed children aged 6 to 23 months in Hawassa City, Ethiopia, 2024.....</i>	<i>23</i>

List of Acronyms

ANC	Antenatal Care
EDHS	Ethiopian Demographic and Health Survey
EMDHS	Ethiopian Mini Demographic and Health Survey
HEW	Health Extension Workers
IYC	Infants and Young Children
IYCF	Infant and Young Child Feeding
MAD	Minimum Acceptable Diet
MAM	Moderate Acute Malnutrition
MDD	Minimum Dietary Diversity
MMF	Minimum Meal Frequency
MMFF	Minimum Milk Feeding Frequency
SAM	Severe Acute Malnutrition
SSA	Sub-Saharan Africa
UNICEF	United Nations Children's Fund
WHO	World Health Organization

Abstract

Background: The increasing practice of non-breastfeeding is a major concern, particularly in urban areas. Meal frequency measurement has different standards among non-breastfed children. However, the primary focus of nutrition studies has been on breastfeeding, leading to a lack of comprehensive data on meal frequency and its association with underweight status among non-breastfed infants.

Objective: This study was aimed at assessing the minimum meal frequency and its association with underweight among non-breastfed infants and young children aged 6 to 23 months in Hawassa city, Ethiopia, from May 12, 2024, to July 08, 2024.

Methods: A community-based cross-sectional study was conducted among 423 non-breastfed children aged 6 to 23 months in Hawassa City. First, the estimation was made to know whether there is an adequate sample of non-breastfed or not in the community. Then, the sample was allocated proportionally to all sub-cities based on population size. After that, one of the sub-cities was chosen at random, and the first non-breastfed child from that sub-city was identified. Finally, the collection process began with the identified child and proceeded using consecutive sampling. Data was collected using Kobo Collect-enabled mobile phones, an interviewer-administered questionnaire, and a weight scale. The association between underweight and explanatory variables was assessed using binary logistic regression.

Result: A total of 420 respondents participated in the study. The percentage of non-breastfed children who fulfilled minimum meal frequency (MMF) was 62.9%, and the prevalence of underweight was 10%. Non-breastfed children who did not fulfill the MMF were 5.2 times more likely to be underweight compared to those who met the requirement per day ($p = <.001$, AOR; 5.2, 95% CI: 2.5, 11.0). Compared to the children whose mothers' age was above 35, those children whose mothers' age was between 15 and 24 and between 25 and 34 had a lower risk of being underweight ($p = 0.04$, AOR; 0.15, 95% CI: 0.02, 0.93) and ($p = 0.03$, AOR; 0.15, 95% CI: 0.03, 0.8), respectively.

Conclusion: The findings of our study indicated that about three out of five children were fed with meal frequency according to World Health Organization recommendations. Adherence to the recommendation of meal frequency might reduce the risk of being underweight. Studies incorporating qualitative approaches might be helpful in generating in-depth information to address the issue related to the causes of having lower meal frequency among non-breastfed IYC.

Key Words: Non-breastfed, Underweight, Minimum meal frequency

1. Introduction

1.1. Background

The nutritional status of infants and young children (IYC) under two years is directly affected by their feeding practices (1). To assess IYC feeding practices, the World Health Organization (WHO) and the United Nations International Children's Emergency Fund (UNICEF) introduced a number of complementary feeding indicators. Among these was the minimum meal frequency (MMF). MMF measurement in non-breastfed infants follows different recommendations both in content and frequency. For breastfed IYC, it measures the percentage of IYC aged 6–23 months who consumed solid, semi-solid, or soft foods at least two times for those aged 6–8 months and three times for those aged 9–23 months in the past 24 hours. For non-breastfed IYC, it measures the percentage of non-breastfed children 6–23 months of age who were fed solid, semi-solid, or soft foods, including milk feeds, at least four times in the previous 24 hours (2). Non-breastfed IYC is those who did not receive breast milk in the past 24 hours for any reason (2, 3).

Worldwide, improper feeding practices during the first two years of life are responsible for over two-thirds of child deaths from both under- and over-nutrition (4). Underweight, a form of under-nutrition, is defined as low weight-for-age (5). Globally, 99 million under-five children were underweight, with almost one-third of them living in Africa (6). The magnitude of underweight in Ethiopia was 23.3% in 2016 (7) and 21% according to the Ethiopian Mini Demographic and Health Survey (EMDHS) 2019 (8). Numerous factors, such as the child's gender, birth size, mother's educational attainment, household wealth index, antenatal care (ANC) visits (9), child age, type of toilet facility (10), husband's education (11), and mother's age (12) influence underweight.

There are efforts underway in Ethiopia to implement a multi-sectorial nutrition intervention plan. The Ethiopian government developed the Seqota Declaration in 2015, a 15-year commitment to eradicate child malnutrition in Ethiopia by 2030(13). Additionally, in order to end hunger by 2030, Ethiopia supported the National Nutrition Program II in 2016, which offers a framework for the coordinated implementation of nutrition interventions. One of the main interventions under NNP II to reduce under-nutrition was optimal complementary feeding (14). Furthermore, in 2018, National Food and Nutrition Policy was also developed to addresses immediate and underlying causes of malnutrition in Ethiopia, focusing on prevention of under-nutrition (15). However, in Ethiopia only 45 per cent of IYC aged 6–23 are fed at least three times a day in 2022 (16). EMDHS 2019 reported that the percentage of non-breastfed IYC who met the MMF increased marginally from 49% to 51% since 2016 (8).

1.2. Statement of problem

A child's energy intake can be inferred from the minimum meal frequency (17). Unlike the usual measurement of minimum meal frequency in breastfed IYC, in non-breastfed IYC it includes milk feeds. Milk feeds can include infant formula, any animal milk, and yogurt. The reason for this indicator was that eating meals/snacks less frequently than advised can impair total calorie and micronutrient intake, resulting in poor weight gain. (18).

Appropriate complementary feeding during this critical age of the children is fundamental to the development of each child's full human potential (19). According to an earlier estimate, the prevention of 13% and 6% of under-five mortality, respectively, was achieved through optimal breastfeeding and appropriate complementary feeding (20). According to the UNICEF report, one of the two most significant immediate causes of malnutrition is inadequate dietary intake (21). Furthermore, several studies have demonstrated the effect of MMF on the nutritional status of IYC aged 6–24 months. For example, a study conducted in India, Malawi, and Tanzania to explore the association between MMF and underweight revealed that children who consumed the MMF had lower odds of being underweight (22–24). However, the children who received meals at least three times per day were one in two (48%) globally (25), 41.2% in SSA (26), and 63.80% in Ethiopia (27).

Globally, around 45% of deaths among children under the age of 5 years are linked to under-nutrition with substantial burden in Africa (28). According to a WHO report in 2022, 28% of child mortality in Ethiopia was caused by under-nutrition (29). Despite a kind of under-nutrition that causes significant infant mortality in low- and middle-income countries, the global prevalence of underweight children decreased from 24.8% to 13% between 1990 and 2019 (30). Global hunger, on the other hand, increased dramatically between 2019 and 2021 and has remained stable until 2023 (31). This means that the hunger trend is not yet heading in the right direction to meet the objective of eliminating hunger by 2030.

In SSA, among the 632 malnutrition-related deaths, 90.1% of cases were underweight (32) (33). According to the study that assessed the magnitude of underweight among 30 LMICs, Ethiopia is among the countries with the highest burdens of underweight (24.91%) (9). A study conducted in 2022 in Ethiopia showed that the overall national prevalence of underweight was 44.7% in 2000, 23.8% in 2019 (34), and 21% in 2023 (35). These findings suggest that underweight trends in Ethiopia have witnessed a lower relative decrease than expected, implying a lower possibility of meeting the Sustainable Development Goal, which is to eliminate all forms of malnutrition, including underweight, by 2030. Maternal age, education, and antenatal care status; child's sex, age, birth weight, and having

more siblings; children from households with the poorest and poorer wealth index and non-improved toilet facilities; and inadequate diet diversity were among the factors associated with underweight (36, 37).

Breastfeeding has many advantages and is advised for up to two years or beyond (38); however, there has been higher practice of non-breastfeeding in Ethiopia, particularly in urban areas. For instance, only 5.28% of the children were not breastfeeding in 2016 (39), but about 47% of mothers terminate breastfeeding before 24 months in 2023 (40). Despite increasing practice of non-breastfeeding, little attention is given to ensuring that these children are getting the optimal meal. In Ethiopia, various studies were undertaken to investigate MMF among IYC. Nonetheless, MMF measurement has different standards among non-breastfed IYC and hasn't been measured among these IYC. In addition, never or interrupted breastfeeding with inappropriate feeding practices increases the likelihood of malnutrition and mortality (4), and studies have shown breastfeeding has a protective effect on underweight (41). Similarly, many studies investigated the prevalence of underweight among children under- five. However, none of the studies indicated the prevalence of underweight based on the child's breastfeeding status.

Therefore, this study intends to examine the prevalence of MMF and its association with underweight status among non-breastfed IYC aged 6 to 23 months in Hawassa city.

1.3. Rationale of the study

The increase in the prevalence of non- breastfeeding is still a major concern in our country, particularly in urban areas, due to mothers working conditions and lack of a breastfeeding place at the working area. Non-breastfed IYC are those who are more likely to suffer from malnutrition, higher rates of illness, and death because they are unable to benefit from all of the nutrients that nursing provides during early life. In addition, MMF measurement in non-breastfed follows different recommendations both in content and frequency. Eating meals less frequently than the standard can impair calorie intake, resulting in poor weight gain. Furthermore, Ethiopia is among the SSA countries with the highest prevalence of underweight. However, insufficient care is paid to ensuring that these children are getting the optimal nutrition and are in good nutritional state. This knowledge gap is particularly critical given the well-established link between under-nutrition and inadequate meal intake during the first two years of life.

1.4. Significance of the study

The findings of this study will provide valuable insights for various stakeholders involved in nutrition issues, including the Ministry of Health, nutrition intervention programmers, nutrition education service providers, and public health researchers. These insights will inform the development of effective interventions, public nutrition education campaigns, and future research directions to address under-nutrition among not-breastfed IYC. Ultimately, this study contributes to the advancement of child health and nutrition in our country.

2. Literature Review

2.1. Underweight

2.1.1 Overview of underweight or weight-for-age

Underweight occurs when a child weighs less than what one would anticipate for a healthy, well-nourished child of the same age and sex and is assessed using the weight-for-age index (42). Weight-for-age is a composite index of height-for-age and weight-for-height. It takes into account both acute and chronic malnutrition. Underweight children are those whose weight-for-age z-score is less than minus two standard deviations (-2 SD) from the median of the reference population (43). The double burden of malnutrition, which is the co-occurrence of under-nutrition along with overweight and obesity, has been increasing globally over the past 20 years. Nevertheless, global hunger increased dramatically from 2019 to 2021 and has remained high as of 2023 (31). This suggests that the hunger trend is not yet heading in the right direction to meet the objective of eradicating hunger by 2030. Global agencies estimated that in 2022, 148.1 million children under 5 years were stunted and 45 million were wasted, with children in Africa accounting for two out of five for stunting and more than one quarter for wasting (44).

Worldwide, the prevalence of underweight declined from 26.5% in 1990 to 17.6% in 2015, but in Africa, it was estimated to increase from 24.0% to 26.8% (45). A cross-sectional study done in Turkey in 2024 among IYC aged 6-24 months found that the prevalence of underweight was 4.3% (46). Secondary analysis of the General Nutrition Survey, which investigated IYCF practices and their associations with nutritional status among IYC aged 6-23 months in Vietnam in 2020, showed that the magnitude of underweight was 5.6% (47). Despite global improvements in the prevalence of under-nutrition (underweight, wasting, and stunting) among young children over the last decade, SSA nations continue to face a significant burden that threatens child survival and well-being. According to the earlier report of the meta-analysis conducted among SSA countries, the prevalence of under-nutrition was highest among countries in East Africa, and Ethiopia was one of the nations with the highest underweight prevalence (25.2%) (48). Another study conducted in Cameroon to evaluate complementary feeding practices and their association with the nutritional status of IYC reported that the prevalence of underweight was 9.35% (49). The overall national prevalence of underweight in Ethiopia was 25.5% and 23.8% in 2016 and 2019, respectively (34). Additionally, the study done in 2020 in Ethiopia reported that the prevalence of underweight was 27.7% (37).

2.1.2. Causes and risk factors associated with underweight

UNICEF's conceptual framework illustrates that inadequate dietary intake and illness are the two most significant immediate causes of malnutrition. Inadequate access to food in a household, insufficient health services, an unhealthful environment, and inadequate care for children and women are the underlying causes of inadequate dietary intake and illness. The basic causes of child malnutrition include inadequate economic development and political commitment for effective policies to ensure an enabling environment for good nutrition (50). Research has shown that many factors are associated with being underweight.

A study conducted to examine factors associated with adverse nutritional status of children in Sub-Saharan Africa showed that children whose mothers were between 15 and 24 years, whose mothers did not attend antenatal care, had no education, and those with primary education; children who were 12–23 months old, whose gender was male, and who were from households with non-improved toilet facilities were more likely to experience underweight (36). Another study done to assess predictors of underweight among children in Ghana found that the children whose ages were between 12 and 23 months, whose gender was female, whose mothers had lower educational levels, who were from households with unimproved sources of drinking water and unimproved toilet facilities, and who had diarrhea two weeks prior to the survey were significantly predicted underweight (51).

Some investigations were undertaken in Ethiopia to examine the prevalence of underweight and its associated factors among IYC; however, these studies did not study MMF. For example, a study done to assess the under-nutrition and associated factors among IYC aged 6–24 months in Wollega, Ethiopia, found that children who were from households having family members of ≥ 5 , children who were between the ages of 12 and 24 months, who were not fully immunized, and who had not received vitamin A supplementation were more likely to be underweight (52). A similar study done in the Oromia region, Ethiopia, found that female gender, higher age of the child (12–23 months), inadequate diet diversity, lack of growth monitoring service, and maternal own income increase the likelihood of child underweight (37). Another study done to assess under-nutrition and associated factors among IYC aged 6–23 months old at Dessie, Ethiopia, showed that the age of the child between 12 and 17 months (AOR = 4.62; 95% CI: 2.65, 8.06) and male sex of the child (AOR = 1.93; 95% CI: 1.21, 3.07) were associated with underweight (53). In addition, a few investigations also assessed the prevalence of under-nutrition and associated factors by including MMF as one of the factors; however, the studies were primarily conducted among breastfed IYC. For example, a cross-sectional study investigated under-nutrition and associated factors among IYC aged 6–23 months (55 non-breastfed and 525 breastfed) in Southeast

Ethiopia and reported that being male (AOR=3.44), not using growth monitoring services (AOR=2.00), having a history of fever (AOR =4.24), household food insecurity (AOR=2.04), and lack of improved water (AOR=3.00) showed significant association with underweight (54).

2.2. Minimum meal frequency (MMF)

2.2.1 Definition and magnitude of minimum meal frequency

Minimum meal frequency is when non-breastfed IYC received four feedings of solid, semi-solid, or soft foods or milk feeds. The minimum meal frequency for non-breastfed IYC includes milk feeds, in contrast to the standard measurement for breastfed IYC (55). There are so many studies conducted among IYC regarding the prevalence of MMF. In Brazil, a cross-sectional study that examined variations in the complementary feeding indicators of infants aged 6 to 23 months based on breastfeeding status revealed that the adequacy of minimum meal frequency (MMF) for non-breastfed IYC was 94.9% and 40.3% for breastfed IYC (56). This study showed non-breastfed children have better adequacy of meal frequency compared to breastfed. According to a DHS multilevel analysis conducted to evaluate the pooled prevalence of MMF and its contributing factors in Sub-Saharan Africa (SSA), the pooled prevalence of MMF among IYC aged 6–23 was 38.47%. This study showed one of the factors associated with MMF was the child's current breastfeeding status. The study found that breastfeeding children had 16% higher prevalence of MMF than non-breastfeeding children (57).

However, another multilevel analysis in 2019, conducted to identify the predictors of a minimum acceptable diet among IYC aged 6–23 months in Nepal, showed the prevalence of minimum meal frequency was 68.5%, and the likelihood of achieving MMF is higher among currently breastfeeding children compared to the non-breastfeeding children (58). Similarly, according to the 2019 EMDHS, 51% of non-breastfed children met the minimum meal frequency, which is slightly lower than breastfed (56%) (8). According to a systematic review and meta-analysis done in Ethiopia to ascertain the prevalence of minimum meal frequency and the factors that are linked to it among IYC aged 6 to 23 months, a pooled prevalence of MMF was 63.80% (27). Several investigations were undertaken in Ethiopia to examine the prevalence of MMF; however, nothing is known about its magnitude based on a child's breastfeeding status.

2.3. Underweight and its association with minimum meal frequency

Adequate provision of nutrients, beginning in the early stages of life, is crucial to ensure good physical and mental development. Poor availability or access to food of adequate nutritional quality and quantity

has led to large sections of the world's population being undernourished (59). More than two-thirds of malnutrition-related child deaths during the first 2 years of life are caused by inappropriate feeding practices globally (4). Different research has shown underweight and its association with minimum meal frequency. A study conducted in India to assess complementary feeding practices and underweight status among children reported that the children who consumed the minimum number of meals had lower odds of being underweight compared to the ones who did not (22). Another Tanzanian study that examined the impact of improper complementary feeding practices on the nutritional status of infants aged 6 to 24 months revealed that children who ate fewer meals per day were more likely to become underweight (24). Also, another study conducted to analyze the associations between breastfeeding and complementary feeding practices with under-nutrition in Malawi using the 2015–16 Malawi Demographic and Health Survey (MDHS) found that IYC who met minimum meal frequency were less likely to be underweight (60). Some studies have investigated the association between MMF and underweight in other settings; however, it is still unknown according to the child's breastfeeding status. Moreover, in our country little is known about the issue under study. This knowledge gap is particularly critical given the well-established link between under nutrition and inadequate complementary feeding practices during the first two years of life. Furthermore, this is more important if it is specifically known among those who are more vulnerable to under-nutrition (those who are not breastfed).

2.4. Controversies on the association between underweight and minimum meal frequency

However, it is fact that those children who were not well-nourished are prone to under-nutrition, some of the study findings reported that there is no significant association between good practice of complementary feeding indicators and the nutritional status of children. For example, a study done in Cameroon, South Asia, Malaysia Ghana, and Nigeria aimed to evaluate complementary feeding practices and their association with the nutritional status of children in reported that none of the complementary feeding indicators they have assessed (MAD, MMF or MDD) have an association with any form of under-nutrition (49, 61-64). Those some additional studies conducted in other settings assessed IYCF practices and their association with children's nutritional status however the finding of those studies showed conflicting evidence.

In summary, the following are the identified causes and risk factors that affected the underweight status among the children:

Socio-demographic and economic characteristics include child age and sex; parental characteristics such as marital status, education level, occupation, mother's religion, and age; and household characteristics like family size and wealth index.

Underlying causes include household food insecurity; inadequate care for children, such as a history of the child's breastfeeding status (never started, started but ceased, or not breastfed in the previous 24 hours); insufficient health services like ANC visits, place of delivery, vaccination, vitamin A supplementation, and growth monitoring programs; and an unhealthful environment like toilet facilities, sources of drinking water, and food hygienic practices for mothers or caregivers.

Immediate causes include illness/disease experience (fever/diarrhea episodes) and poor dietary intake, such as insufficient dietary diversity, meal frequency, number of milk feedings, and acceptable diets. Despite global improvements in the estimated prevalence of underweight among young children over the last two decades, a significant burden still threatens child life and well-being in SSA countries. According to a recent study, underweight has led to significant child mortality; however, Ethiopia is among the East African countries with the highest prevalence of underweight. According to the UNICEF report, poor dietary intake is one of the two most significant immediate causes of malnutrition. In addition, there are some studies shown the relationship between inappropriate meal feeding frequency and the underweight status of children in other settings. However, one in every two children aged 6-23 months were not given enough meals or snacks every day around the world, and only two out of every five children in sub-Saharan Africa met the minimum meal frequency requirements. Similarly, in Ethiopia less than one in every two IYC aged 6–23 is fed at least three times per day in 2022. Several studies were conducted assessing infant and young child feeding indicators like MMF and associated factors in Ethiopia. Similarly, some investigations were undertaken in Ethiopia to examine the prevalence of underweight and its associated factors among children under-five; however, these studies did not study MMF. Furthermore, interrupted breastfeeding and improper complementary feeding practices can raise the risk of underweight status. However, previous studies conducted primarily included breastfed children and did not report the magnitude based on the child's breastfeeding status. Moreover, little is known regarding the minimum meal frequency and its association with underweight among non-breastfed IYC. This has caused a dearth of thorough data on the magnitude of MMF and its association with the underweight status of non-breastfed IYC. For this reason, our study intends to examine the prevalence of minimum meal frequency and its association with underweight status among non-breastfed infants and young children aged 6 to 23 months in Hawassa City.

The Conceptual Framework

The conceptual framework below elucidates the immediate, underlying, and basic factors of underweight. It has been demonstrated that disease experiences like diarrhea episodes and poor dietary intake, in terms of diversity, frequency, and adequacy, are immediate factors of underweight. The two immediate factors are related to each other. Underlying causes of underweight include inadequate access to food, lack of care, poor maternal and child health services, and unhealthy environments. Low access to food can result in inadequate dietary intake. Poor maternal and child health services and unhealthy environments can increase the risk of infection. Socio-demographic and economic conditions include child, parental, and household characteristics. Lack of care, limited access to health services, and decreased food availability can result from the parents' low educational attainment, limited employment, and poor wealth index.

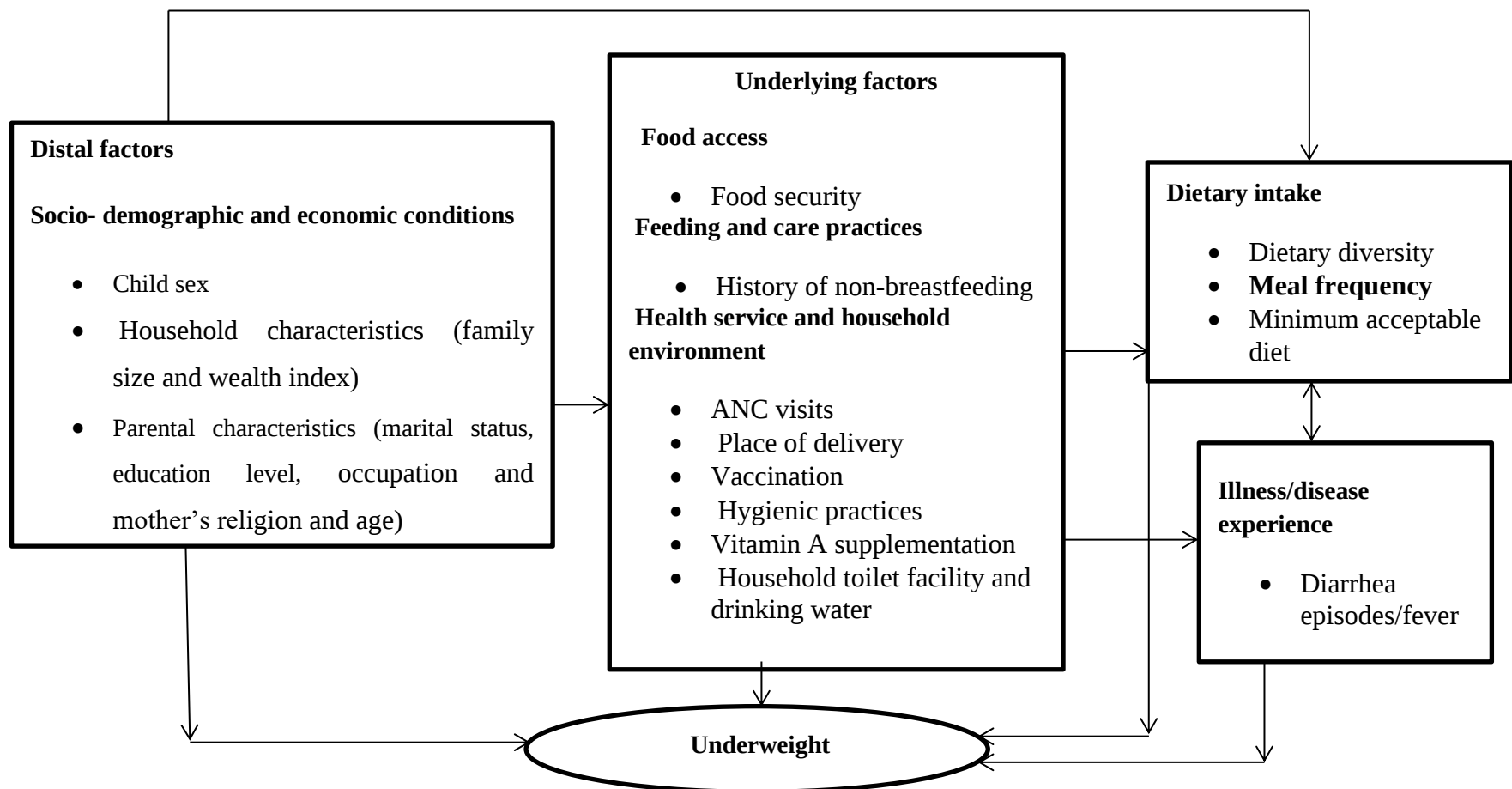


Figure 1: A conceptual framework for minimum meal frequency and its association with underweight among infants and young children aged 6 to 23 months in Hawassa City, Ethiopia, developed from the different literature (36, 37, 50-54)

3. Objectives of the Study

3.1. General Objective

To assess minimum meal frequency and its association with underweight among non-breastfed infants and young children aged 6 to 23 months in Hawassa City, Ethiopia, from May 12, 2024 to July 08, 2024.

3.2. Specific Objectives

- To assess the prevalence of minimum meal frequency among non-breastfed infants and young children aged 6 to 23 months
- To determine the magnitude of underweight among non-breastfed infants and young children aged 6 to 23 months
- To examine the association between minimum meal frequency and underweight among non-breastfed infants and young children aged 6 to 23 months

4. Methods and Materials

4.1. Study Area and Period

Our study was carried out in Hawassa City, Sidama National Regional State, and Southern Ethiopia. Hawassa city is located 273 Km away from Addis Ababa, the capital of Ethiopia. In 2024, the city had an estimated total population of 415,816 and the total number of children aged 6 to 23 months in Hawassa City was 14,595. The city had 8 sub-cities, four public hospitals (1 comprehensive specialized hospital, 1 general hospital, and 2 primary hospitals), six private hospitals, seven health centers, 47 private clinics, and 15 health posts (Hawassa city health department). According to estimates, the city's non-breastfed population was 771(5.3%). This study was conducted from May 12, 2024 to July 08, 2024.

4.2. Study Design

A community-based cross-sectional study design was used

4.3. Population

4.3.1. Source Population

All non-breastfed infants and young children aged 6–23 months residing in Hawassa City in 2024.

4.3.2. Study Population

All selected non-breastfed infants and young children aged 6–23 months living in Hawassa City

4.3.3. Inclusion Criteria

Infants and young children aged 6–23 months:

- Who didn't breastfeed in the past 24 hours during the data collection
- Who never started breastfeeding, and were not breastfed for a long time (started but stopped).

4.3.4. Exclusion Criteria

The children were excluded when they had the following conditions:

- The child was on ready-to-use therapeutic food and hospital visit in the last week
- The mother/caregiver was absent from the household for those who were on breastfeeding but not breastfed in the previous 24 hours
- The house is closed after three visits for those who either never started or started but ceased breastfeeding

- The mother/caregiver was unable to raise a child by herself

4.4. Sample Size Determination

The sample size was calculated using a single population proportion formula, with a proportion of 50% for this study. It is by considering 50% of children will be underweight. This is because no studies were undertaken specifically among non-breastfed children aged 6 to 23 months regarding our topic, and the sample size for the other specific objectives was also not determined independently for the same reasons.

$$n = \frac{(Z_{\alpha/2})^2 p (1-p)}{d^2}$$

$$n = \frac{(1.96)^2 (0.5) (0.5)}{(0.05)^2} = \frac{(3.8416) (0.25)}{0.0025} = 384$$

= 384 + 38.4 = 423 with consideration of 10% contingency to non-responders

Where

n - Required sample size

$Z_{1-\alpha/2}$ - critical value for normal distribution at 95% confidence level which equals to 1.96

P - The estimate of proportion = 0.5, taking into account that 50% of children will be underweight

d - Possible margin of sampling error tolerated which is 5%

4.5. Sampling Procedure

The study was conducted in all eight sub-cities. To obtain individual sample units or subjects at the household level, the following steps were followed:

- First, the estimation was made to know whether there is an adequate sample of non-breastfed or not in the community. This was needed before conducting the survey since non-breastfed are rare populations, and the number of non-breastfed in the city was unknown. To estimate the number, the total number of children aged 6 to 23 months in Hawassa city = 3.51% = 14,595 (Hawassa city health department) and the magnitude of non-breastfeeding in Ethiopia = 5.28% (39) were used. Based on these data, an estimated number of non-breastfed children in the city was 771=

the total number of children aged 6 to 23 months in Hawassa city (14595) * the prevalence of non-breastfeeding in Ethiopia (0.0528).

- Next, the calculated sample size (423) was divided and proportionally allocated to all eight sub-cities based on their total population.
- After that, one of the sub-cities was chosen at random, and the first non-breastfed child from that sub-city was identified.
- Finally, the collection process began with the identified child and proceeded using consecutive sampling. The use of this sampling method was necessary because this study can't have a sampling frame. This is also because this study included those IYC who were temporarily not breastfed for any reasons in the previous 24 hours. Children who were identified as not-breastfed in the previous 24 hours during identification time may begin breastfeeding when the collectors come back to collect the actual data. Therefore, the date of data collection and the identification of children who are not breastfed should coincide.

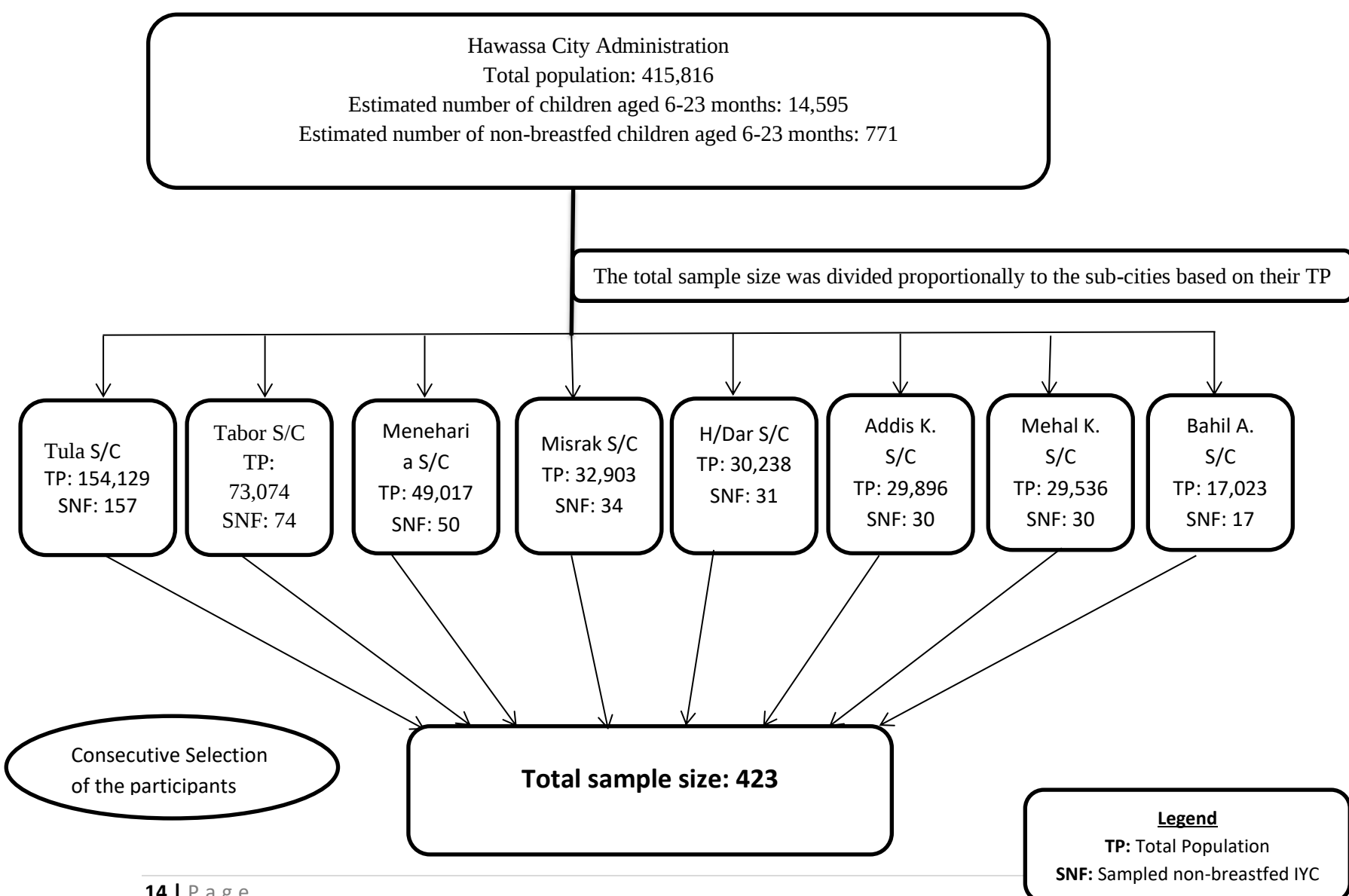


Figure 2: Sampling procedure for minimum meal frequency and its association with underweight among non-breastfed children aged 6 to 23 months in Hawassa City, Ethiopia, 2024.

4.6. Variables of the Study

4.6.1. Dependent Variable

Underweight: Weight-for-age z-score is less than -2 SD from the median of the reference population (65)

4.6.2. Independent Variables

Socio-demographic characteristics

- Child sex
- Parental characteristics (marital status, education level, occupation and mother's religion and age)
- Household characteristics (family size and wealth index)

The underlying causes:

Food access

- Food insecurity

Feeding and care practices for children

- History of breastfeeding status (never started, started but ceased or not breastfed in the previous 24hr)

Maternal and child health services and household environment

- ANC visits
- Vaccination
- Vitamin A supplementation
- Place of delivery
- Hygienic practice
- Household toilet facility and the source of drinking water

Immediate causes:

Illness/disease experience

- Diarrhea episodes/fever

Dietary intake

- **Meal frequency**
- Dietary diversity
- Minimum acceptable diet

4.7. Data Collection Procedures

Data were collected from mothers and caregivers of children 6–23 months of age using an interviewer-administered questionnaire face-to-face. WHO/UNICEF’s interviewer-administered structured standard questions were used to collect data for infant and young child indicators (18), and questions for socio-demographic characteristics and other explanatory variables were adapted from other similar studies (8, 30, 36, 37, 51) with some modifications to fit the local context. The questionnaire was translated into the local language, Amharic, for data collection. The weight of the children was measured using a calibrated digital scale, GST-221 (INDIA), by removing heavy clothing and double-checking the weight. The digital scale has a maximum load capacity of 180 kg. The mother and child were weighed together, and the mother’s weight was subtracted to get the child’s weight. The data were collected and supervised by 3 diploma-holder nurses and 1 BSc-holder healthcare professional, respectively. The Kobo Collect enabled mobile phones were used to gather the data.

4.8. Operational Definitions

Non-breastfed infants and young children: They were infants and young children who were not breastfed in the past 24 hours (2).

Minimum meal frequency: Non breastfed children 6-23 months of age who receive both milk feeds and solid/semi-solid feeds at least 4 times in the past 24 hours. Milk feeds include liquid milk products such as infant formula, cow milk or other animal milk and yogurt (17).

Improved drinking water sources: This includes drinking water from pipes, protected dug wells or springs, boreholes or tube wells, rainwater, and packaged or delivered water (66).

Unimproved toilet facilities: The use of pit latrines without a slab or platform and flush and pour-flush toilets discharging to an open drain (66).

Household food security status: Was assessed by nine food insecurity questions that hold the occurrence of food insecurity in the previous month. It was measured using the Household Hunger Scale and categorized as non/light hunger, moderate hunger, and severe hunger (67).

Household wealth index: Was assessed by fifteen household wealth index questions and created by using principal component analysis (PCA). A household wealth score was classified into lowest, middle, and highest (8) .

4.9. Data Management and Analysis Procedure

The data were collected using Kobo Collect and were exported to the Statistical Package for Social Sciences (SPSS) version 27 for cleaning and analysis.

Descriptive statistics, such as frequencies and proportions, were used to describe data. Principal component analysis (PCA) was used to construct a household wealth index, and a household wealth score was classified into lowest, middle, and highest. WHO Anthro software version 3.2 was used for classification of child nutritional status based on weight-for-age. The child was categorized as underweight if weight-for-age < -2 z-score and no underweight if weight-for-age ≥ -2 z-score (WHO standards) (65). The percentage of non-breastfed IYC who fulfilled minimum meal frequency (MMF) was calculated by dividing the number of non-breastfed children aged 6 to 23 months who met the MMF by the total number of surveyed children aged 6 to 23 months and multiplying it by 100. The MMF was dichotomized and coded as 1 and 0, representing those who met and those who did not meet MMF. Binary logistic regression was used to determine the association between the outcome and explanatory variables. Models were fitted to adjust for confounding variables and determine the association. The p-value of less than 0.25 was used to select candidate variables in bivariate analysis. The goodness-of-fit for the final regression models was checked by the Hosmer-Lemeshow goodness-of-fit test, which yielded a p value of p of 0.89. To declare statistical significance, a p-value of less than 0.05 was used. Adjusted odds ratio and 95% confidence interval were used to explain the association.

4.11. Data Quality Assurance

Data collection tools were initially prepared in English and translated into Amharic and then back to English to check for their consistency. Training on the tool was given to the data collectors and supervisor for a day. A pretest was done on 5% of the study sample at Yirgalem town. Then necessary modifications were made on the tool based on the pre-test results before commencing the actual data

collection. The principal investigator coordinated, and the supervisor coached the data collection process on a daily basis.

4.12. Ethical Consideration

The study was conducted after getting ethical clearance from the Addis Ababa University, School of Public Health Research Ethics Committee (REC). A formal letter of permission was obtained from Addis Ababa University, the Sidama Regional Health Bureau, and the Hawassa City Health Department. Informed verbal consent was obtained from the mothers and caregivers of children after explaining the objective and benefit of the study. Furthermore, the participants were assured about the confidentiality of the data, and the information was recorded anonymously.

4.13. Dissemination of Results

The result of this study will be submitted and presented to Addis Ababa University College of Health Sciences, School of Public Health, Department of Nutrition and Dietetics, and will as well be published in peer-reviewed scientific journals.

5. Results

From 423 eligible samples, about 420 mother-child pair participated in this study, attaining a 99.3% response rate.

5.1. Socio-demographic and economic characteristics

Of the 420 mothers who participated in the study, 311 (74%) were between the ages of 25 and 34, 220 (52.4%) were protestant by religion, 335 (79.8%) were college-educated or above, 214 (50.8%) were employed by the government, and almost all of the mothers, 415 (98.8%) were married. Among the fathers' of the children who participated in the study, 348 (82.9%) were college-educated or above, and 275 (65.3%) were public employees by occupation. Among the IYC, 291 (69.3%) were categorized under the age group 18-23 months. From the total of 420 households, 275 (65.5%) had less than 5 family members, and 142 (33.8 %) were each lowest and middle in wealth index (Table 1).

Table 1: Socio-demographic and economic characteristics of the study participants in Hawassa City, Ethiopia, 2024 (n=420)

Variables	Frequency	Percentage
Maternal age(in years)		
15-24	98	23.3
25-34	311	74.0
>=35	11	2.6
Religion		
Protestant	220	52.4
Orthodox	113	26.9
Catholic	31	7.4
Apostles	25	6.0
Muslim	14	3.3
Other	17	4
Maternal education level		
Have no formal education-able to read and write	3	0.7
Primary education	3	0.7
Secondary education	73	17.4
College and above	335	79.8
Don't know	6	1.4

Maternal occupation

Public employee	214	51.902
Businesswomen	89	20.2
House wife	819	121.31
Private employee	333	7.799
Daily laborer	314	050.8

Paternal educational level

Have no formal education-able to read and write	348	082.9
Primary	51	10.22
Secondary	63	15.7
College and above	303	82.59
Don't know	5	01.72

Paternal occupation

Public employee	275	65.5
Businessman	96	22.9
Private employee	28	6.7
Daily laborer	21	5.0

Marital Status

Married	415	98.8
Others (divorced, never married and widowed)	5	1.2

Child age (in completed months)

6-11	45	10.7
12-17	84	20.0
18-23	291	69.3

Family size

=<5	275	65.5
>=6	145	34.5

Household wealth index

Lowest	142	33.8
Middle	142	33.8
Highest	136	32.4

5.2.Underlying causes of underweight

About 400 (95.2%) of the 420 mothers who took part in the study had ANC follow-up at least 4 times, 399 (95.0%) gave birth in a health facility, 417 (99.3%) washed their hands with soap while feeding their children, 409 (97.4%) were not served food within 2 hours after cooking, and 412 (98.1%) cleaned their child's utensils with soap. Of the 420 infants and young children in the study, 253 (60.2%) had started breastfeeding but had stopped before the age of two, 318 (75.7%) had not received vitamin A in the previous six months, and 377 (89.8%) had received the vaccinations least 4 times. Of the households, 346 (82.4%) were either food secure or had light hunger, 403 (96%) had improved toilet facilities, and 420 (100%) had improved sources of drinking water (Table 2).

Table 2: The underlying causes of underweight among non-breastfed infants and young children aged 6–23 months in Hawassa City, Ethiopia, 2024 (n=420)

Variables	Frequency	Percentage
History of breastfeeding status		
Haven't fed in the past 24h	98	23.3
Haven't started since birth	69	16.4
Started, but terminated	253	60.2
Antenatal Care (ANC) Visits		
None	3	0.7
1-3	2	0.5
>=4	400	95.2
Don't know	15	3.6
Place of delivery		
Health facility	399	95.0
Home	13	3.1
Don't know	8	1.9
Received vitamin A in the past six months		
Yes	84	20
No	318	75.7
Don't know	18	4.3
Frequency of vaccination the child		
>= 4	377	89.8

< 4	43	10.2
Washing hands with soap while feeding child		
Yes	417	99.3
No	3	0.7
Serving food within 2 hours after cooking		
Yes	11	2.6
No	409	97.4
Child's private feeding utensils are clean		
Yes	412	98.1
No	8	1.9
Toilet facility		
Improved	403	96
Unimproved	17	4
Household food insecurity		
Non/Light hunger	346	82.4
Moderate hunger	70	16.7
Severe hunger	4	1.0

5.3. Immediate causes of underweight

Among the IYC, 409 (97.4%) consumed at least two milk feeds, 264 (62.9%) (95% CI: 58.3-67.6) met the minimum meal frequency, only 41 (9.8%) consumed at least five food groups, 19 (4.5%) met the minimum acceptable diet, and 325 participants (77%) reported having fever or diarrhea in the two weeks prior to the survey (Table 3).

Table 3: Immediate causes of underweight among non-breastfed infants and young children aged 6–23 months in Hawassa City, Ethiopia, 2024 (n=420)

Variable	Frequency	Percentage
Minimum dietary diversity		
<5	379	90.2

≥ 5	41	9.8
Minimum meal frequency		
<4	156	37.1
≥ 4	264	62.9
Fulfill minimum acceptable diet		
Yes	19	4.5
No	401	95.5
History of fever/Diarrhoea illness (within the two weeks immediately prior to the survey)		
Yes	325	77.4
No	95	22.6

5.4 Prevalence of Underweight

The prevalence of underweight among non-breastfed infants and young children aged 6–23 months in Hawassa City was 10% (95% CI: 7.4-12.6) with 4% severely underweight (95% CI: 2.4- 6).

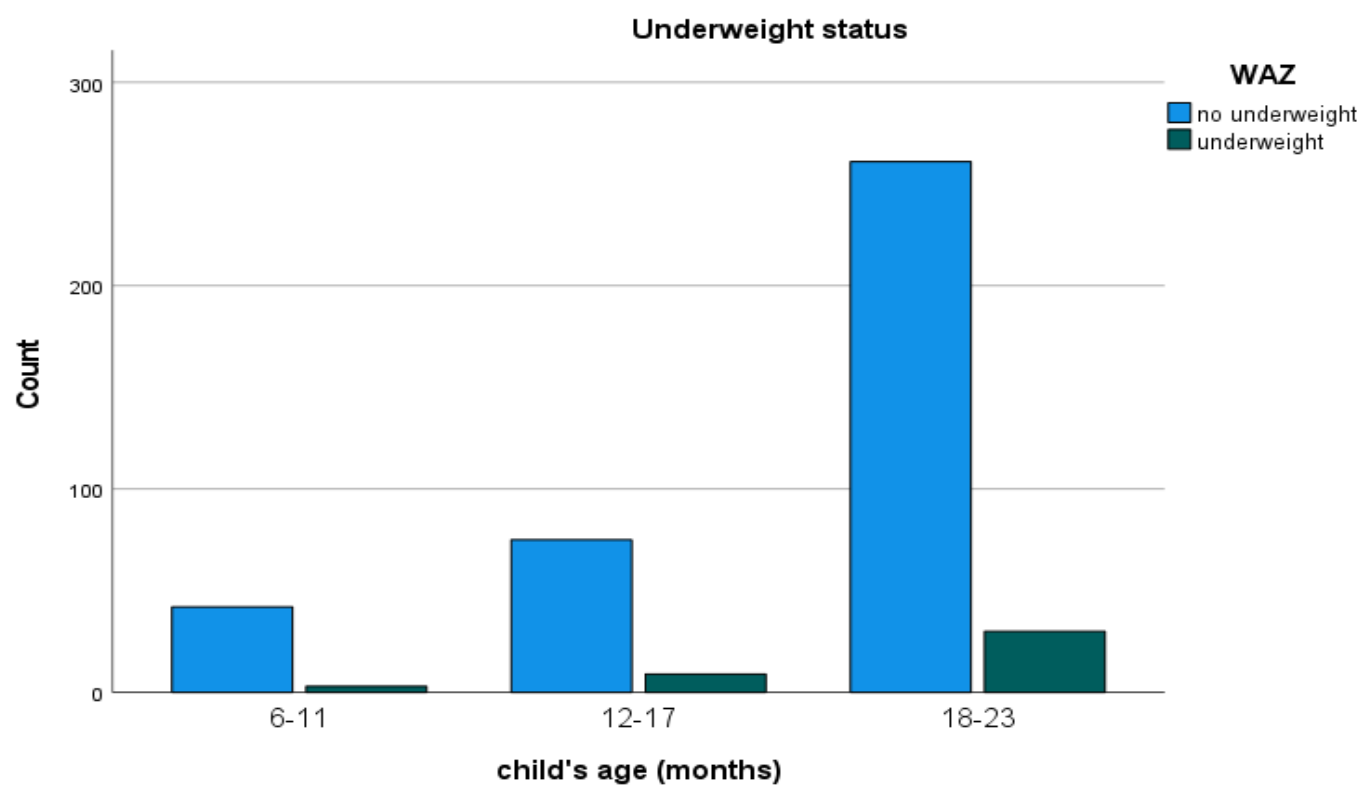


Figure 3: Underweight status distribution among non-breastfed children aged 6 to 23 months in Hawassa City, Ethiopia, 2024.

5.4 Association between minimum meal frequency and underweight among non-breastfed infants and young children

Eight variables out of the twenty-eight in the binary logistic regression analysis had a p-value below 0.25, making them potential candidates for multivariable logistic regression.

The binary logistic regression was employed to identify factors associated with outcomes of underweight. Non-breastfed children aged 6-23 months who did not meet the minimum requirement of meal frequency per day had a 5.2-fold higher risk of being underweight than those who did ($p = <.001$, AOR; 5.2, 95% CI: 2.5, 11.0). Compared to the children whose mothers' age was above 35, those children whose mothers' age was between 15 and 24 had a 96% lower risk of being underweight ($p = 0.04$, AOR; 0.15, 95% CI: 0.02, 0.93), and those whose mothers' age was between 25 and 34 had 97% lower odds of being underweight ($p = 0.03$, AOR; 0.15, 95% CI: 0.03, 0.8).

Table 4: Binary logistic regression for association between minimum meal frequency and underweight among non-breastfed infants and young children aged 6–23 months in Hawassa City, Ethiopia, 2024 (n=420)

Variables	Underweight		COR (95% CI)	AOR (95% CI)
	Yes (%)	No (%)		
Minimum meal frequency				
<4	30 (7.1)	126 (30)	5.0 (2.5, 10.0)	5.2 (2.5, 11.0)*
>=4	12 (2.9)	252 (60)	1	1
Maternal age				
15-24	8 (1.9)	90 (21.4)	0.10 (0.03,0.43)	0.15 (0.02,0.93)*
25-34	29 (6.9)	282 (67.1)	0.12 (0.04,0.43)	0.15 (0.03,0.79)*
>=35	5 (1.2)	6(1.4)	1	1
Maternal occupation				
Daily laborer	1 (0.2)	2 (0.5)	4.6 (0.4, 52.0)	6.9 (0.2, 379)
House wife	7 (1.7)	74 (17.6)	0.9 (0.4, 2.1)	0.6 (0.2, 1.9)
Businesswomen	9 (2.1)	80 (19)	1.0 (0.5, 2.4)	0.5 (0.2, 1.6)
Private	4 (1)	29 (6.9)	1.3 (0.4, 4.0)	1.1 (0.3, 4.4)

employee				
Public	21(5)	193 (46)	1	1
employee				
Paternal				
occupation				
Daily laborer	2(0.5)	19 (4.5)	1.2 (0.3, 5.3)	0.48 (0.04, 5.93)
Businessman	12 (2.9)	84 (20)	1.56 (0.7,3.3)	1.5 (0.6, 4.2)
Private	5 (1.2)	23 (5.5)	2.4 (0.8, 6.9)	2.09 (0.57, 7.67)
employee				
Public employee	23(5.5)	252 (60)	1	1
Family size				
>=6	18 (4.3)	127 (30.2)	0.5 (0.3, 0.1)	0.7 (0.3, 1.8)
=<5	24 (5.7)	251 (59.8)	1	1
History of child				
breastfeeding				
status				
Haven't fed in the past 24hour	7 (1.7)	91 (21.7)	0.57 (0.24, 1.35)	0.4 (0.2, 1.1)
Haven't started since birth	5 (1.2)	64 (15.2)	0.58 (0.23, 1.56)	0.6 (0.2, 1.9)
Started, but terminated before two years	30 (7.1)	223 (53.1)	1	1
Place of delivery				
Health facility	38 (9)	361(86)	0.16 (0.04, 0.76)	0.23 (0.02, 2.9)
Home	1 (0.2)	12 (2.9)	0.14 (0.01, 1.68)	0.22(0.01, 6.61)
Not applicable	3 (0.7)	5 (1.2)	1	1
Household food				
insecurity				
Non/Light hunger	37 (8.8)	309 (73.6)	0.36 (0.36, 3.5)	0.56 (0.03, 11.6)
Moderate hunger	4 (1)	66 (15)	0.18 (0.02, 2.2)	0.32 (0.02, 7.08)

Severe	1 (0.2)	3 (0.7)	1	1
Hunger				

Notes: Hosmer-Lemeshow goodness-of-fit test p-value = 0.89

*= p-value < 0.05

COR: Crude Odds Ratio, AOR: Adjusted Odds Ratio

Discussion

The objective of this study was to assess the prevalence of minimum meal frequency and its association with underweight among non-breastfed infants and young children aged 6 to 23 months in Hawassa city. Minimum meal frequency and child sex were among the factors associated with the underweight status of the children.

Our study revealed that the prevalence of minimum meal frequency (MMF) was 62.9%. This prevalence was consistent with the prevalence reported by a systematic review and meta-analysis carried out in Ethiopia, which was 63.8% (27). The consistency might be due to both studies being conducted in Ethiopia. Even if the mentioned systematic review included all IYC aged 6 to 23 months regardless of their breastfeeding status, the MMF prevalence was found to be consistent with the current study. However, the finding of this study was significantly lower compared to a similar study conducted in Brazil that revealed an overall prevalence of MMF among non-breastfed IYC was observed to be 94.9% (56). This wide difference might be because of the socio-economic variance between the two nations, as Brazil is one of the upper middle-income countries. On the other hand, our MMF prevalence was higher compared to EMDHS 2019, which showed the overall prevalence of MMF among non-breastfed was 52% (8). The higher prevalence could be explained by the fact that our study was limited to an urban area, and this might be due to having better educational status, food availability, and information accessibility in urban areas.

In terms of the magnitude of underweight, the current study showed the prevalence of underweight is 10%, which is in line with a study conducted in South-East Ethiopia (9%) (54). Nonetheless, this study's magnitude was higher than that of Addis Ababa (2.17%) (68). The inconsistency might be due to the difference in study participants, in which these studies actually included all breastfed and non-breastfed IYC. This might imply a lack of so many advantages of breastfeeding for non-breastfed IYC and may increase the odds of being underweight among them. On the other hand, our underweight prevalence was lower compared to the study conducted in the Oromia region in Ethiopia, which reported the prevalence of underweight was 27.7% (69). This higher prevalence could be explained by the fact that the Oromia study was conducted in largely food insecure and rural areas. This might indicate better feeding practices in cities compared to rural areas.

Regarding the association between the children's underweight status and the minimum meal frequency, the current study demonstrated that non-breastfed children who did not meet the WHO minimum requirement of meal frequency had a higher chance of being underweight than those who did. This result is consistent with various studies in India (22), Tanzania (24), and Malawi (60) involving infants and young children of the same age group corroborate the link between a lower risk of underweight and appropriate consumption of minimum meal frequency. Since this Complementary Feeding Indicator principally evaluates quantity, it was expected that the main anthropometric parameter it affects will be

weight for age, which is a marker of early caloric deficit. When a child consistently consumes fewer calories than their body requires for growth and development, it can lead to insufficient energy availability, resulting in weight loss or the inability to gain weight appropriately.

Unlike our study finding, different studies in Cameroon (49), Malaysia (62), and Ghana (63) conducted to assess similar issues reported there is no significant association between minimum meal frequency and child underweight status. This contentious finding of the studies could be attributed to differences in study design, which is hospital-based cross-sectional, involving children attending Infant Welfare Clinics in the case of Cameroon. This is due to the major concern, which is selection bias: patients in a hospital are not representative of the general population, and if the sample is not representative of the population of interest, the observed association may not generalize to the population and can lead to biased estimates of the association's strength. It may be due to the effect of a lower sample size (conducted using only 94 IYC aged 6 to 23 months) in the case of the Malaysia study. This is also due to the fact that small samples are more susceptible to random variation. Even if there's a true association, a small sample might not provide enough evidence to detect it, leading to a weak or non-significant result. And it might be due to differences in the study period in the case of the Ghana study.

6. Strengths and limitations of the study

6.1.Strengths:

- The use of standardized tools and controlling the potential confounders in the estimation of the association between minimum meal frequency and underweight
- Electronic data collection was conducted using Kobo Collect to improve the quality of the data and reduce missing data

6.2. Limitations:

- The cross-sectional nature of the study design may not be appropriate to measure the temporal relationship between minimum meal frequency and underweight.
- Despite the widely accepted validity and reliability of data obtained from self-reported, interviewer-administered 24-hour time format in nutritional epidemiological studies, socially desirable responses and forgetfulness still pose a challenge and may thus have affected some of the findings.

7. Conclusions

- Based on the findings of this study, more than three out of five infants and young children were fed meal frequency according to WHO recommendations. One out of ten non-breastfed infants and young children were underweight. The result also indicated that adherence to the WHO recommendation of meal frequency might reduce the risk of being underweight among non-breastfed children.

8. Recommendations

The following recommendations have been forwarded to all concerned bodies based on the findings of the study.

Ministry of Health (MOH)

- To strengthen the existing initiatives to enhance the proportion of the IYC fulfilling minimum meal frequency so that underweight prevalence could be reduced.

Health Professionals

- To focus on the nutritional status and feeding practices of non-breastfed infants and young children whose mother's age is above thirty-five

Researchers

- Studies incorporating qualitative approaches might be helpful in generating in-depth information to address the issue related to the causes of having lower meal frequency among non-breastfed IYC.

9. References

1. USAID FANTA and FHI 360. Developing Tools to Measure Progress on Infant and Young Child Feeding. 2014.
2. World Health Organization and the United Nations Children's Fund (UNICEF). Indicators for assessing infant and young child feeding practices. 2021.
3. Ministry Of Health Ethiopia. Guideline for Infant and Young Child Feeding in Emergencies for Ethiopia. 2021.
4. World Health Organization and United Nations Children's Fund. Global Strategy for Infant and Young Child Feeding 2002.
5. World Health Organization Malnutrition. 2024.
6. UNICEF WHO and The World Bank. Levels and Trends in Child Malnutrition. 2014.
7. Tekile KA Woya AA and Basha WG. Prevalence of malnutrition and associated factors among under-five children in Ethiopia: evidence from the 2016 Ethiopia Demographic and Health Survey. BMC. 2019;12.
8. Ethiopian Public Health Institute (EPHI) Central Statistical Agency (CSA) WB USAID and UNICEF. Mini Demographic and Health Survey 2019. 2021.
9. Tamir TT Zegeye FA Workneh SB and Mekonen GE. Underweight and associated factors among children under age of five in low and lower-middle income African countries: hierarchical analysis of demographic and health survey data. Frontiers in Public Health 2024;12.
10. Moshi CC Sebastian JP Mushumbusi GD Azizi AK KE, et.al,. Determinants of underweight among children aged 0– 23 months in Tanzania. Wiley Periodicals LLC. 2021;10.
11. Birhan YT and Angaw AD. Trends and Determinants of Underweight among Children under Five Years in Ethiopia: Further Analysis with Ethiopian Demographic and Health Survey 2005–2016—Multivariate Decomposition Analysis. Nutrition and Metabolism. 2022.
12. Fenta MH Tesfaw ML and Derebe AM. Trends and Determinants of Underweight among Under-Five Children in Ethiopia: Data from EDHS. International Journal of Pediatrics. 2020;2020.
13. Government of Ethiopia. Seqota Declaration. 2015.
14. Federal Democratic Republic Of Ethiopia. National Nutrition Program 2016–2020. 2016.
15. Federal Democratic Republic of Ethiopia. Food and Nutrition Policy. 2018.
16. UNICEF. Annual report UNICEF Nutrition Ethiopia 2022.
17. World Health Organization. Indicators for assessing infant and young child feeding practices. 2008.

18. World Health Organization and the United Nations Children's Fund. Indicators for assessing infant and young child feeding practices, 2021.
19. Pan American Health Organization and World Health Organization Guiding principles for complementary feeding of the breastfed child 2001.
20. World Health Organization. Infant and young child feeding 2009.
21. Akanji OO. UNICEF the state of the world's children Economic and Financial Review. 1998;36.
22. Rai S and Unisa S. Complementary Feeding Practices and Underweight Status Among Children Age 6-23 Months in India. The Journal of Family Welfare. 2019;64.
23. Twabi HS Manda SOM and Small DS. Evaluating the Effect of Appropriate Complementary Feeding Practices on Child Growth in Malawi Using Cross-Sectional Data. Frontiers in Nutrition. 2021;8.
24. Masuke R Msuya SE Mahande JM Diarz EJ Stray-Pedersen B Jahanpour O. et al. Effect of inappropriate complementary feeding practices on the nutritional status of children aged 6-24 months in urban Moshi, Northern Tanzania. PLOS ONE. 2021.
25. UNICEF (United Nations Children's Fund). Feed to fail. 2021.
26. Aboagyea RG SA, Ahinkorahe BO, Cadriif A , Frimpong JB , Dadzieb LK. et.al. Prevalence and predictors of infant and young child feeding practices in sub-Saharan Africa. International Health 2023.
27. Wake DA. Prevalence of Minimum Meal Frequency Practice and Its Associated Factors among Children Aged 6 to 23 Months in Ethiopia: A Systematic Review and Meta-analysis Global Pediatric Health. 2021.
28. World Health Organization. Child mortality (under 5 years). 2022.
29. Ethiopian Public Health Institute. The Cost of Hunger in Ethiopia: Implications for Africa's Social and Economic Transformation Implications for the Growth and Transformation of Ethiopia. 2013.
30. Hossain M MM Abdulla F and Rahman A. Prevalence and risk factors of underweight among under-5 children in Bangladesh: Evidence from a countrywide cross-sectional study. PLOS ONE. 2023.
31. FAO IFAD UNICEF WFP and WHO. The State Of Food Security and Nutrition in the World – Financing to end hunger, food insecurity and malnutrition in all its forms. Rome.; 2024.
32. Madewell ZJ Keita AM Das PM Mehta A Akelo V and Oluoch OB. et al. Contribution of malnutrition to infant and child deaths in Sub-Saharan Africa and South Asia. BMJ Global Health 2024.

33. Ahmed FN Abedin M sultan M Ahammed B Ali M and Yeasmin AM .et.al. Identifying the factors causing malnutrition and its impact on mortality among under-five Bangladeshi children. Research Gate. 2021.
34. Atalell KA Alemu TG and Wubneh CA. Mapping underweight in children using data from the five Ethiopia Demographic and Health Survey data conducted between 2000 and 2019: A geospatial analysis using the Bayesian framework. frontiers. 2022.
35. United Nations Children’s Fund. Ethiopia Annual Report,. 2023.
36. Adedokun ST and Yaya S. Factors associated with adverse nutritional status of children in sub-Saharan Africa: Evidence from the Demographic and Health Surveys from 31 countries. Maternal and Child Nutrition. 2020.
37. Tafese Z Alemayehu FR Anato A Berhan Y and Stoecker BJ. Child Feeding Practice and Primary Health Care as Major Correlates of Stunting and Underweight among 6- to 23-Month-Old Infants and Young Children in Food-Insecure Households in Ethiopia. Nutritional Epidemiology and Public Health. 2020.
38. World Health Organization Department of Child and Adolescent Health and Development Department of Nutrition for Health and Development. FEEDING THE NON-BREASTFED CHILD 6-24 MONTHS OF AGE. 2004.
39. Wondim A Techane MA Wubneh CA Assimamaw NT Belay GM and Tamir TT .et.al. Major maternal related determinants of nonbreastfeeding among mothers in Ethiopia: A multilevel analysis from DHS Ethiopia 2016. PLOS ONE. 2023.
40. Tesgara BB Aredo MT Batu D Gebre SD Gebretsadik S and Desalegn T. Early Termination of Breast-Feeding Practice and Associated Factors Among Mothers of Children Under 2 Years Old in Asella Referral and Teaching Hospital. 2024.
41. Fekadu Y Mesfin A Haile D and Stoecker BJ. Factors associated with nutritional status of infants and young children in Somali Region, Ethiopia: a cross- sectional study. BMC. 2015.
42. Cashin K and Oot L. Guide to Antnropometry : A Practical Tool for Program Planners, Managers, and Implementers 2018.
43. Ghana Statistical Service (GSS) Ghana Health Service (GHS) and ICF International. Ghana Demographic and Health Survey. 2014.
44. United Nations Children’s Fund (UNICEF) World Health Organization (WHO) International Bank for Reconstruction and Development or The World Bank. Levels and trends in child malnutrition: UNICEF / WHO / World Bank Group Joint Child Malnutrition Estimates:. 2023.
45. Onis M Blossner M Borghi E Frongillo AE and Morris R. Estimates of Global Prevalence of Childhood Underweight in 1990 and 2015. American Medical Association. 2024;291.

46. Celik NM and Köksal E. Application of the infant and young child feeding index and the evaluation of its relationship with nutritional status in 6-24 months children. *Brazilian journal of nutrition*. 2024.
47. Tan YP Som VS Nguyen DS Tran TD Tran TN and TranKV. Complementary feeding practices and nutritional status in Vietnamese infants aged 63 to 23 months. 2020.
48. Akombi BJ AK, Merom D, Renzaho AM, Hall JJ Child malnutrition in sub-Saharan Africa: A meta-analysis of demographic and health surveys (2006-2016). 2017.
49. Lontsi A Djike P Gabisa N Ekoube E Linwa MM and Monono M. Association Between Complementary Feeding Practices and Nutritional Status in Children Aged 6-24 Months Using the Complementary Feeding Index Score and WHO Indicators. *Medicine and Biomedical Sciences* 2024;25.
50. United Nations Children's Fund. UNICEF Conceptual Framework on Maternal and Child Nutrition. 2021.
51. Acquah E Darteh EKM Amu H and Daniel and Adjei KA. Predictors of underweight in children under-five years in Ghana. 2019.
52. Jima HG. Under-nutrition and Associated Factors among Children aged 6 months to 24 months in Gida Ayana District, East Wollega, Western Ethiopia Research Gate. 2019.
53. Sewenet T W/Selassie M Zenebe Y Yimam W and Woretaw L. Undernutrition and Associated Factors Among Children Aged 6–23 Months in Dessie Town, Northeastern Ethiopia, 2021: A Community Based Cross-Sectional Study. *Frontiers in Pediatrics*. 2022.
54. Ararsa GG Getachew MT Diddana TZ and Alemayehu RF. Prevalence of undernutrition and associated factors among children aged 6–23 months: a cross-sectional analysis from South-East Ethiopia *Journal Of Nutritional Science*. 2023;12.
55. Tekeba B Gonete AT Dessie MT Zegeye AF and Tamir TT. Spatial Variation and Determinants of Inadequate Minimum Meal Frequency among Children Aged 6–23 Months in Ethiopia: Spatial and multilevel analysis using Ethiopian Mini Demographic and Health Survey (EMDHS) 2019. *Annals of Global Health* 2024.
56. Leonez RVGD Melhema FRA Vieira GD Mellob FD and Saldana CP. Complementary feeding indicators for children aged 6 to 23 months according to breastfeeding status. 2020.
57. Tebeje MT Abebe M Tesfaye HS Argaw SG Seifu LB and Seboka TB. Minimum meal frequency and associated factors among children aged 6–23 months in Sub-Saharan Africa: a multilevel analysis of the demographic and health survey data. *Frontiers in Public Health*. 2024.
58. Sapkota S Gyawali A and Hu Y. Predictors of Minimum Acceptable Diet among Children Aged 6–23 Months in Nepal: A Multilevel Analysis of Nepal Multiple Indicator Cluster Survey 2019. 2019.

59. WHO. Comprehensive Implementation Plan On Maternal, Infant And Young Child Nutrition. 2014.
60. Twabi HS, Manda SOM, Small DS. Evaluating the Effect of Appropriate Complementary Feeding Practices on Child Growth in Malawi Using Cross-Sectional Data: An Application of Propensity Score Matching. *Front Nutr.* 2021;8:714232.
61. Campbell RK Aguayo VM Kang Y Dzed L Joshi V and Waid J .et.al. Infant and young child feeding practices and nutritional status in Bhutan. *Maternal and Child Nutrition* 2015.
62. Bong MW Karim NA and Noor MI. Nutritional status and complementary feeding among Penan infants and young children in rural Sarawak, Malaysia, 2018.
63. Anin KS Saaka M Fischer F and Kraemer A. Association between Infant and Young Child Feeding (IYCF) Indicators and the Nutritional Status of Children (6–23 Months) in Northern Ghana. 2020.
64. Udoh EE and Amodu OK. Complementary feeding practices among mothers and nutritional status of infants in Akpabuyo Area, Cross River State Nigeria. 2016.
65. Federal Ministry of Health Ethiopia. National Guideline for the Management of Acute Malnutrition in Ethiopia 2019.
66. Ethiopian Federal Ministry of Health (FMOH). National Standard Definitions for Sanitation Hygiene and Water.; 2021.
67. Coates Jennifer Anne Swindale and Paula Bilinsky. Household Food Insecurity Access Scale (HFIAS) for Measurement of Food Access: Indicator Guide. Washington, D.C.: FHI 360/FANTA.; 2007.
68. Shibeshi AH and Asfaw ZG. The influence of minimum dietary diversity on undernutrition among children aged 6–23 months in Ethiopia: a multilevel mixed-effect analysis based on 2019 Ethiopian mini demographic and health survey. *Frontiers in Public Health.* 2024.
69. Tafese Z Reta F Mulugeta B and Anato A. Undernutrition and associated factors among children 6–23 months old in largely food insecure areas of rural Ethiopia. *Journal of Nutritional Science.* 2022;11.

11. Annexes

Annexes 1

Participant information sheet in English

Title of the study: Effect of minimum meal frequency on underweight status of children aged 6 to 23 month in Hawassa City, Ethiopia, 2024

Name of Investigator: Lidetash Wolde (BSc.)

Name of the Organization: AAU

Name of the Sponsor: WSU

Introduction: This information sheet is prepared for Hawassa city Health Bureau. The aim of the form is to make purpose of research and the data collection procedures clear to the above concerned offices and get permission to conduct the research.

Topic: Minimum meal frequency and its association with underweight among non-breastfed infants and young children aged 6 to 23 months in Hawassa city, Ethiopia.

Purpose of the study: To assess Minimum meal frequency and its association with underweight among non-breastfed children aged 6 to 23 months in Hawassa city, Ethiopia and this information collected from your community will serve as baseline information for concerned bodies to identify the magnitude of the problem and to take corrective action to improve the country's under-nutrition.

Participant procedure and guidelines: In order to conduct the study and achieve the above objective, necessary information will be obtained from questionnaire and assessment of underweight done by the data collectors by using a calibrated digital weight scale.

Participant benefit and Risk: the information that will be obtained will not cause any harm to the participants. Any identification of the participant including the name will not be recorded on the questionnaire and all information obtained will be kept secretly. Moreover, the information will only be used for the purpose of the study.

Benefit: The study will not have direct benefit for the participants. But the result of this study will provide valuable insights for various stakeholders involved in nutrition issues, including the Ministry of Health, nutrition intervention programmers, nutrition education service providers, and public health researchers.

Confidentiality: To assure the confidentiality of the information, data will be collected by trained health professionals without the name of the participants. The information obtained from this study will only be revealed to principal investigator and will be stored in a computer locked by password.

Person to contact: the following contact addresses will be given to contact investigators at any time

Lidetash Wolde

Addis Ababa University College of Health Sciences School of Public Health Department of Nutrition and Dietetics

Cell Phone: 0989913091

E-mail lidetashiw@gmail.com

Annex II: Subject Information Sheet

Addis Ababa University, School of public health

Hello, I am _____. I work for Addis Ababa University, School of Public Health. I am studying the impact of minimum meal frequency on underweight among 6 to 23 months old non-breastfed infants and young children. I have received permission from Addis Ababa university school of public health. Your participation in this study is voluntary. You have the right not to participate in this study or option out even after the interview started. Deciding not to participate in the study will not harm your life. However, I encourage your participation in the study since the information you provide will help concerned bodies to improve children's under-nutrition.

If you agree to participate in the study, you will be interviewed about your overall socio-demographic and economic status, child feeding practice, disease conditions and Health service and household environment. Filling the questionnaire will take about 25 minutes. This study will help in creating awareness about the contribution of meal frequency on reduction of underweight among under two children. The information that you provide will be kept confidential. The data will be anonymized by replacing all identifiers with codes. No one will have access to the non-coded data except the principal investigator and the data will not be used for purposes other than the intended study. If you have any question, comments, or complaints, you can reach the researcher through the following address:

Investigator: **Lidetash Wolde** (Principal investigator), College of Health Sciences, Department of Nutrition and Dietetics: AAU.

Phone-0989913091

E-mail lidetashiw@gmail.com

Annex III: Oral consent form

Annex III: Oral consent form

I have heard all the information stated above about the study as it was read to me by the data collector. I fully understand the purpose, benefit and risk of the study and I have freely decided to participate or not to participate in this study.

Tick “X” on Agree if the subject decided to participate or on disagree if not

Agree_____ I disagree_____ STOP

Thank You for willingness to participate

11.5. Annexes IV: Questionnaire by English version

Questionnaire code _____ Date _____

Name of Data Collector _____ Name of the Sub-city _____

Yesterday during the day or at night was the [child's name] breastfed?

1. Yes 2.No 3. Don't know. Continue interview if the answer is NO. Unless please skip to the next child

No	Question	Possible answers	Skipping
Part 1: Socio-demographic characteristics			
A Paternal characteristics			
01	Educational status?	1. Have no formal education 1a Not able to read and write 1b Able to read and write 2 Primary education 3 Secondary education 4 College and above 5 Don't know	
02	Occupation?	1 Employed 2. Businessman 1a public employee 3. Daily laborer 1b Private employee 4. Farmer 5 other (specify)	
B Maternal characteristics			
03	Age (in years)?	_____in completed years	
04	Religion?	1. Protestant 2. Orthodox 3. Catholic 4. Apostles 5. Muslim 6. Other (specify)	

05	Education level?	1 Have no formal education 1a Not able to read and write 1b Able to read and write 2 Primary 3 Secondary 4 College and above 5 Don't know	
06	Marital status?	1. Never married 4. Divorced 2. Married 5. Widowed 3. Separated	
07	Occupation?	1 Employed 2. Businesswomen 1a public employee 3. Daily laborer 1b Private employee 4. House wife 5 Other (specify)	
C Child characteristics			
09	Age (in months)?	_____in months	
10	Sex?	1. Male 2. Female	
D Household characteristics			
11	Household size?	_____in number	
12A House hold wealth index questions			
a1	What is the main source of drinking water for members of your household?	1 Piped water 11. Piped into dwelling 12. Piped to neighbor	

		13. Public tap/standpipe 2 Dug well 21. Protected well 22. Unprotected well 3. Other(specify)	
a2	What kind of toilet facility do members of your household usually use?	1. Flush or pour flush toilet 12. Flush to septic tank 13. Flush to pit latrine 14. Flush to somewhere else 15. Flush, don't know where 2. Pit latrine 21. Ventilated improved pit latrine 22. Pit latrine with slab 23. Pit latrine without slab/open pit	
a3	Do you share this toilet facility with other households?	1 Yes 2 No	

a4	What type of fuel does your household mainly use for cooking?	1. Electricity 2. Charcoal 3. wood 4. other(specify)	
12B. Does your household have-----?			
b1	A non-mobile telephone?	1. Yes 2. No	
b2	A television?	1. Yes 2. No	
b3	A computer?	1. Yes 2. No	
b4	A refrigerator?	1. Yes 2. No	
b5	An electric mitad?	1. Yes 2. No	
12C. Does any member of this household own-----?			
c1	A mobile phone?	1. Yes 2. No	
c2	A motorcycle or motor scooter?	1. Yes 2. No	
c3	A car or truck?	1. Yes 2. No	
c4	Material of the floor of the dwelling	1. Natural floor 2. Rudimentary floor 3. Finished roofing 4. other(specify)	
c5	Material of the roof of the dwelling.	1. Natural floor 2. Rudimentary floor 3. Finished roofing 4. other(specify)	

c6	Material of the exterior walls of the dwelling	1. Natural floor 3. Finished roofing	2. Rudimentary floor 4.other(specify)	
13. Household Food Insecurity questions				
1	In the past four weeks, did you worry that your household would not have enough food?	0 = No 1=Yes 3=NA		Skip to Q2 if the answer is No/NA
1a	How often did this happen?	1. Rarely (once or twice in the past four weeks) 2. Sometimes (three to ten times in the past four weeks) 3. Often (more than ten times in the past four weeks)		
2	In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	0 = No 1=Yes 3=NA		Skip to Q3 if the answer is No/ NA
2a	How often did this happen?	1. Rarely (once or twice in the past four weeks) 2. Sometimes (three to ten times in the past four weeks) 3. Often (more than ten times in the past four weeks)		
3	In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources?	0 = No 1=Yes 3=NA		Skip to Q4 if the answer is No/ NA

3a	How often did this happen?	1. Rarely (once or twice in the past four weeks) 2. Sometimes (three to ten times in the past four weeks) 3. Often (more than ten times in the past four weeks)	
4	In the past four weeks, did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?	0 = No 1=Yes 3=NA	Skip to Q5 if the answer is No/ NA
4a	How often did this happen?	1. Rarely (once or twice in the past four weeks) 2. Sometimes (three to ten times in the past four weeks) 3. Often (more than ten times in the past four weeks)	
5	In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	0 = No 1=Yes 3=NA	Skip to Q6 if the answer is No/ NA
5a	How often did this happen?	1. Rarely (once or twice in the past four weeks) 2. Sometimes (three to ten times in the past four weeks) 3. Often (more than ten times in the past four weeks)	
6	In the past four weeks, did you or any	0 = No	Skip to

	other household member have to eat fewer meals in a day because there was not enough food?	1=Yes 3=NA	Q7 if the answer is No/ NA
6a	How often did this happen?	4. Rarely (once or twice in the past four weeks) 5. Sometimes (three to ten times in the past four weeks) 6. Often (more than ten times in the past four weeks)	
7	In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?	0 = No 1=Yes 3=NA	Skip to Q8 if the answer is No/ NA
7a	How often did this happen?	1. Rarely (once or twice in the past four weeks) 2. Sometimes (three to ten times in the past four weeks) 3. Often (more than ten times in the past four weeks)	
8	In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?	0 = No 1=Yes 3=NA	Skip to Q9 if the answer is No/ NA
8a	How often did this happen?	1. Rarely (once or twice in the past four weeks) 2. Sometimes (three to ten times in the past four weeks) 3. Often (more than ten times in the past four weeks)	

9	In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?	0 = No 1=Yes 3=NA	
9a	How often did this happen?	1. Rarely (once or twice in the past four weeks) 2. Sometimes (three to ten times in the past four weeks) 3. Often (more than ten times in the past four weeks)	
E. Hygienic practice Questions for mothers or caregivers			
14	Did you wash your hand with soap while feeding child?	1. Yes 2.No	
15	Did you serve food immediately (within 2 hours) after preparation to your child?	1. Yes 2. No	
16	Child's private feeding utensils are clean?	1. Yes (if they are washed thoroughly and looks clean) 2. No (if utensils are dusty and looks dirty)	
Part 2 Maternal and child health service utilization			
17	How many times do you have ANC follow up for this specific baby?	————in number	
18	Place of delivery?	1. Health facility 2. Home 3. Don't know	

19	What about your child's breastfeeding status?	1 Haven't started since birth 2 Started, but ceased before 2 years age 3 breastfeeding baby, but haven't fed in the past 24 hour	
20	Does your child received Vitamin A supplementation, a past 6 months	1. Yes 2. No 3. Don't know	
22	Does your child have history of fever or diarrhea 2 weeks before this survey?	1.Yes 2.No	
23	How many times did your child receive vaccine?	————in number	

Part 3. Infant and young children feeding indicators

24. Minimum milk feeding frequency

24a	Yesterday did the child consume any milk products? This includes: infant formula, yoghurt, yoghurt drink or fresh/powdered animal milk?	1.Yes 2.No 9. Don't know	Skip to question 130 ,if the answer is NO/Don't know
24b	Yesterday how many times did [child' X] consume any milk products I mentioned?	1.....times 2 Don't know	

25. Minimum dietary diversity

Yesterday during the day or at night, did [NAME] eat: -----?			
A	Pumpkin/ carrots/ tomato sweet potatoes/ Cabbage/Ripe mangoes/papayas /orange or banana or else that are orange inside	1.Yes 2.No 9. Don't know	
B	Porridge/ Injera /bread, rice/ white potatoes/ pasta/ cassava or other foods made from grains such as tef, oats, maize, barley?	1.Yes 2.No 9. Don't know	
C	Any meat such as beef, pork, lamb, goat, chicken, or fish?	1.Yes 2.No 9. Don't know	
D	Eggs?	1.Yes 2.No 9. Don't know	
E	Beans/ peas/ lentils/ nuts?	1.Yes 2.No 9. Don't know	
F	Any dark green, leafy vegetables like Cabbage, Broccoli, spinach or any other fruits or vegetables	1.Yes 2.No 9. Don't know	
26. Minimum meal frequency			
Yesterday at home or somewhere during the day or at night, did the child have...?			
A	Infant formula like Alula, selectmil, liptomil or other...?	1.Yes 2.No 9. Don't know	Skip next question if the answer is NO/Don' t know
a1	How many times did the child drink formula	-----times	

B	Yogurt drinks such as ergo	1.Yes 2.No 9. Don't know	Skip next question if the answer is NO/Don't know
b1	How many times did the child drink yogurt?	-----times	
C	Milk from animals, such as fresh, tinned or powdered milk?	1.Yes 2.No 9. Don't know	Skip next question if the answer is NO/Don't know
c1	How many times did the child drink milk?	-----times	
D	How many times did the child eat any solid, semi-solid or soft foods yesterday during the day or night?	7or more Not known	

Results for measurements

Weight measurement _____ kg

Length measurement _____ cm

አዲስ አበባ ዩኒቨርሲቲ ጤና ሣይንስ ኮሌጅ

የ ህብረተሰብ ጤና አጠባበቅ ትምህርት ክፍል

የ ተጠያቂው / የ መላሸች የመረጃ ቅፅ

ሰላምታ

ጤና ይስጥልኝ ስሜ _____ ይባላል። እኔ የምሰራው ለአዲስ አበባ ዩኒቨርሲቲ የህብረተሰብ ጤና አጠባበቅ የስነምግብ ትምህርት ክፍል ነው። ስለ ልጅዎ አመጋገብ ጥቂት ጥያቄዎችን ልጠይቅዎት እፈልጋለሁ። ይህም የሀገራችንን የአመጋገብ ሁኔታ ለማሻሻል እንደ የመረጃ ምንጭ ይረዳናል። ከአዲስ አበባ ዩኒቨርሲቲ የህብረተሰብ ጤና ትምህርት ቤት ጥናት ለመስራት ፈቃድ አግኝቻለሁ። በዚህ ጥናት ላይ ያለዎት ተሳትፎ በእርስዎ ፍላጎት ላይ የተመሰረተ ብቻ ይሆናል። ቃለ መጠይቁ ከተጀመረም በኋላ ጥናቱ ላይ ላለመሳተፍ የመምረጥ መብት አልዎት። በጥናቱ ላይ ለመሳተፍ ከተስማሙ ስለ ማግባራዊ ፣ ኢኮኖሚያዊና የመኖሪያ አከባቢ ሁኔታ ፣ ስለ ህጻኑ ጤንነትና አመጋገብ ሁኔታ ቃለ መጠይቅ ይደረግልዎታል። ቃለ መጠይቁን ለመሙላት 25 ደቂቃ ያህል ይወስዳል። የሚሰጡት መረጃ ከድ ቁጥሮችን ብቻ በመጠቀም እና በመቆለፍ በሚስጥር ይጠበቃል። ከመጠይቁ የሚገኘው መረጃ ለጥናቱ አላማ ብቻ የሚውል ይሆናል። የተገኘውንም መረጃ ከዋና ተመራማሪው ውጪ ሌላ ሰው የሚያገኝበት ሁኔታ አይፈጠርም። ማንኛቸውም ጥያቄዎች፣ አስተያየቶች ወይም ቅሬታዎች ካሉ፣ ተመራማሪውን በሚከተለው አድራሻ ማግኘት ይቻላል።

ጠያቂ፡ _____ ስም _____ ፊርማ _____

ልደታሽ ወልዴ

ስልክ-0989913091

ኢሜል lidetashiw@gmail.com

የቃል ፈቃድ መጠየቂያ ቅፅ

የጥናቱን አላማና ይዘት በተመለከተ ከላይ ባለው ቅፅ ላይ በመረጃ ሰብሳቢው አማካኝነት ተነበልኝ ለማዳመጥ ችያለሁ። በመሆኑም የጥናቱን አላማ፤ ጥቅምና ጉዳት በደንብ በመረዳት በጥናቱ ላይ ለመሳተፍ ወይም ላለመሳተፍ ነፃ በፍላጎቴ መርጬለሁ።

ተስማምቻለሁ _____ አልተስማማሁም _____

በጥናቱ ላይ ተሳታፊ ለመሆን ስለመረጡ አመሰግናለሁ።

11.7. መጠይቅ በአማርኛ

የመጠይቅ ኮድ _____ ቀን _____

ቦታ(ክፍለ ከተማ) _____ መረጃ ሰብሳቢ ስም _____

ትላንትና ቀን ወይም ማታ ጡት ጠብቶ/ ጠብታ ነበር?

1. አዎ

2. አይ

9 አላውቅም

መልሱ አይ ከሆነ ቃለ መጠይቁን ይቀጥሉ። ካልሆነ ወደ ሚቀጥለው ልጅ ይሂዱ!

ተ.ቁ	ጥያቄ	ሊሆኑ የሚችሉ መልሶች	መዝ ለል
ክፍል 1: ማህበራዊ-ስነ-ሕዝብ ባህሪያት			
የአባቶች ባህሪያት			
01	የአባት የትምህርት ደረጃ?	1 መደበኛ ትምህርት የላቸውም 1ሀ ማንበብ እና መፃፍ የማይችሉ 1ለ ማንበብ እና መፃፍ የሚችሉ 2 የመጀመሪያ ደረጃ ትምህርት የተማሩ 3 የሁለተኛ ደረጃ ትምህርት የተማሩ 4 ኮሌጅ እና ከዚያ በላይ 5.አላውቅም	

02	የአባት ሥራ ?	1 ተቀጣሪ 1.1 የመንግስት 1.2 የግል 2 ነጋዴ 3. የጉልበት ሰራተኛ 4. ገበሬ 5 ለላ ካለ ግለሰብ	
የእናቶች ባህሪያት			
03	የእናት ዕድሜ (በአመታት)?	_____	
04	የእናት ሃይማኖት?	1. ፕሮቴስታንት 2. ኦርቶዶክስ 3. ሐዋርያት 4. ካቶሊክ 3. ሙስሊም 4. ሌላ	
05	የትምህርት ደረጃ?	1 መደበኛ ትምህርት የላቸውም 1ሀ ማንበብ እና መፃፍ የማይችል 1ለ ማንበብ እና መፃፍ የማይችል 2 የመጀመሪያ ደረጃ 3 ሁለተኛ ደረጃ	

		1 ኮሌጅ እና ከዚያ በላይ 2 አላውቅም	
06	የጋብቻ ሁኔታ?	1 ነጠላ 2 ባለትዳር 3 የተፋቱ 4 ባል የሞተባት	
07	ሥራ?	1 የቤት እመቤት 2 ተቀጣሪ 2.1 የመንግስት 2.2 የግል 3.ነጋዴ 4. የጉልበት ሰራተኛ 5 ለላ ካለ ግለጽ	
የልጆች ባህሪያት			
09	የልጁ ዕድሜ (በወራት)	_____	
10	ፆታ	1. ወንድ 2. ሴት	
የቤተሰብ/የማህበረሰብ ባህሪያት			
11	የቤተሰብ ብዛት	_____	

12 ሀ. የሀብት መረጃ ጠቋሚ			
1	ለቤተሰብዎ አባላት ዋናው የመጠጥ ውሃ ምንጭ ምንድነው?	1. የቧንቧ ውሃ 1.1. ከመኖሪያ ቤት ግቢ 1.2. ከጎረቤት ቧንቧ 1.3. የህዝብ ቧንቧ/ቧንቧ 2. የተቆፈረ ጉድጓድ 2.1. የተጠበቀ ጉድጓድ 2.2. ያልተጠበቀ ጉድጓድ 3. ሌላ (ይግለጹ)	
4	የቤተሰብዎ አባላት አብዛኛውን ጊዜ የሚጠቀሙት ምን ዓይነት የመጸዳጃ ቤት ነው?	1. የውሃ ማስወገጃ ያለው መጸዳጃ ቤት 1.1. የቧንቧ መስመር ዝርጋታ ወደ ፍሳሽ ማስወገጃ ስርዓት የሚወስድ 1.2. ወደ ፍሳሽ ማስወገጃ ገንዳ የሚወስድ 1.3. ወደ ጉድጓድ መጸዳጃ ቤት የሚወስድ 1.4. ወደ ሌላ ቦታ የሚያፈስ 1.5. ፈሳሽ, የት እንደላሚወስደው አላውቅም 2. የጉድጓድ መጸዳጃ ቤት 2.1. አየር የተሞላ የተሻሻለ የጉድጓድ መጸዳጃ ቤት 2.2. የጉድጓድ መጸዳጃ ቤት ከክፍት ጉድጓድ ጋር 2.3. የጉድጓድ መጸዳጃ ቤት ያለክፍት ጉድጓድ 3. ሌላ (ይግለጹ)	
5	ይህንን የመጸዳጃ ቤት መገልገያ ከሌሎች ቤቶች ጋር ይጋራሉ?	1. አዎ 2. አይ	
	ቤተሰብዎ በዋናነት ምግብ	1. ኤሌክትሪክ 3. እንጨት	

7	ለማብሰል ምን አይነት ነዳጅ ይጠቀማሉ?	2. ከሰል 4. ሌላ (ይግለጹ)	
12ሊ. ቤተሰብዎ ----- አለው?			
1	ቴሌቪዥን?	1.አዎ 2.አይ	
2	የቤት ስልክ?	1.አዎ 2.አይ	
3	ኮምፒውተር?	1.አዎ 2.አይ	
4	ማቀዝቀዣ?	1.አዎ 2.አይ	
5	የኤሌትሪክ ሚጣድ?	1.አዎ 2.አይ	
12 ሀ. ከዚህ ቤተሰብ አባል ----- ያለው አለ?			
1	የሞባይል ስልክ?	1.አዎ 2.አይ	
2	ሞተር ሳይክል ወይም ሞተር ስኩተር?	1.አዎ 2.አይ	
3	መኪና ወይም የጫነት መኪና?	1.አዎ 2.አይ	

4	የመኖሪያ ቤቱ ወለል ቁሳቁስ	1. የተፈጥሮ ወለል 3. የተጠናቀቀ ጣሪያ	2. መደበኛ ወለል 4. ሌላ (ይግለጹ)	
5	የቤቱ ጣሪያ ቁሳቁስ.	1. የተፈጥሮ ወለል 3. የተጠናቀቀ ጣሪያ	2. መደበኛ ወለል 4. ሌላ (ይግለጹ)	
6	የመኖሪያ ውጫዊ ግድግዳዎች ቁሳቁስ	1. የተፈጥሮ ወለል 3. የተጠናቀቀ ጣሪያ	2. መደበኛ ወለል 4. ሌላ (ይግለጹ)	
13. የቤተሰብ የምግብ እሴት ጥያቄዎች				
1	ባለፉት አራት ሳምንታት ውስጥ፣ ቤተሰብዎ በቂ ምግብ አይኖረውም ብለው ሰግተው ነበር?	0 = አይ 1=አዎ 3 =አላውቅም	መልሱ አይ ከሆነ ፣ወደ ጥያቄ 2 ዝለል ::	

1.1	ይህ ምን ያህል ጊዜ ተከሰተ?	1. አልፎ አልፎ (ባለፉት አራት ሳምንታት ውስጥ አንድ ወይም ሁለት ጊዜ) 2. አንዳንድ ጊዜ (ባለፉት አራት ሳምንታት ውስጥ ከሶስት እስከ አስር ጊዜ) 3. ብዙ ጊዜ (ባለፉት አራት ሳምንታት ውስጥ ከአስር ጊዜ በላይ)	
2	ባለፉት አራት ሳምንታት ውስጥ እርስዎ ወይም ማንኛውም የቤተሰብ አባል በግብአት እጦት ምክንያት የመረጡትን አይነት ምግብ መመገብ አልቻላችሁም?	0 = አይ 1 = አዎ 3 = አላውቅም	መልሱ አይ ከሆነ ፣ወደ ጥያቄ 3 ዝለል ::
2.1	ይህ ምን ያህል ጊዜ ተከሰተ?	1. አልፎ አልፎ (ባለፉት አራት ሳምንታት ውስጥ አንድ ወይም ሁለት ጊዜ) 2. አንዳንድ ጊዜ (ባለፉት አራት ሳምንታት ውስጥ ከሶስት እስከ አስር ጊዜ) 3. ብዙ ጊዜ (ባለፉት አራት ሳምንታት ውስጥ ከአስር ጊዜ በላይ)	
3	ባለፉት አራት ሳምንታት ውስጥ እርስዎ ወይም ማንኛውም የቤተሰብ አባል በግብአት እጦት ምክንያት የተለያዩ የምግብ አይነት ለመመገብ	0 = አይ 1 = አዎ	መልሱ አይ ከሆነ

	ተቸግሮዋል?	3 =አላውቅም	፤ወደ ጥያቄ 4 ዝለል ::
3.1	ይህ ምን ያህል ጊዜ ተከሰተ?	1. አልፎ አልፎ (ባለፉት አራት ሳምንታት ውስጥ አንድ ወይም ሁለት ጊዜ) 2. አንዳንድ ጊዜ (ባለፉት አራት ሳምንታት ውስጥ ከሶስት እስከ አስር ጊዜ) 3. ብዙ ጊዜ (ባለፉት አራት ሳምንታት ውስጥ ከአስር ጊዜ በላይ	
4	ባለፉት አራት ሳምንታት ውስጥ እርስዎ ወይም ማንኛውም የቤተሰብ አባል ሌሎች የምግብ ዓይነቶችን ለማግኘት በግብአት እጥረት ምክንያት ለመመገብ የማይፈልጓቸውን አንዳንድ ምግቦች ተመግበው ነበር?	0 = አይ 1=አዎ 3 =አላውቅም	መልሱ አይ ከሆነ ፤ወደ ጥያቄ 5 ዝለል ::
4.1	ይህ ምን ያህል ጊዜ ተከሰተ?	1. አልፎ አልፎ (ባለፉት አራት ሳምንታት ውስጥ አንድ ወይም ሁለት ጊዜ)	

		2. አንዳንድ ጊዜ (ባለፉት አራት ሳምንታት ውስጥ ከሶስት እስከ አስር ጊዜ) 3. ብዙ ጊዜ (ባለፉት አራት ሳምንታት ውስጥ ከአስር ጊዜ በላይ)	
5	ባለፉት አራት ሳምንታት ውስጥ፣ እርስዎ ወይም ማንኛውም የቤተሰብ አባል በቂ ምግብ ስላልነበረ ከምትፈልጉት መጠን ያነሰ ምግብ ተመግበው ነበር?	0 = አይ 1=አዎ 3 =አላውቅም	መልሱ አይ ከሆነ ፣ወደ ጥያቄ 6 ዝላል ::
5.1	ይህ ምን ያህል ጊዜ ተከሰተ?	1. አልፎ አልፎ (ባለፉት አራት ሳምንታት ውስጥ አንድ ወይም ሁለት ጊዜ) 2. አንዳንድ ጊዜ (ባለፉት አራት ሳምንታት ውስጥ ከሶስት እስከ አስር ጊዜ) 3. ብዙ ጊዜ (ባለፉት አራት ሳምንታት ውስጥ ከአስር ጊዜ በላይ)	
6	ባለፉት አራት ሳምንታት እርስዎ ወይም ሌላ የቤተሰብ አባል በቂ ምግብ ስላሌለ በቀን ውስጥ መመገብ ካለባችሁ ያነሰ ምግብ ተመግበው ነበር?	0 = አይ 1=አዎ 3 =አላውቅም	መልሱ አይ ከሆነ ፣ወደ ጥያቄ

			7 ዝለል ::
6.1	ይህ ምን ያህል ጊዜ ተከሰተ?	1. አልፎ አልፎ (ባለፉት አራት ሳምንታት ውስጥ አንድ ወይም ሁለት ጊዜ) 2. አንዳንድ ጊዜ (ባለፉት አራት ሳምንታት ውስጥ ከሶስት እስከ አስር ጊዜ) 3. ብዙ ጊዜ (ባለፉት አራት ሳምንታት ውስጥ ከአስር ጊዜ በላይ)	
7	በአለፉት አራት ሳምንታት ውስጥ ምግብ ለማግኘት በሀብት እሮት ምክንያት በቤተሰብዎ ውስጥ ምንም አይነት የሚበላ ምግብ ያልነበረ ጊዜ ነበረ ?	0 = አይ 1=አዎ 3 =አላውቅም	መልሱ አይ ከሆነ ፣ወደ ጥያቄ 8 ዝለል ::
7.1	ይህ ምን ያህል ጊዜ ተከሰተ?	1. አልፎ አልፎ (ባለፉት አራት ሳምንታት ውስጥ አንድ ወይም ሁለት ጊዜ) 2. አንዳንድ ጊዜ (ባለፉት አራት ሳምንታት ውስጥ ከሶስት እስከ አስር ጊዜ)	

		3. ብዙ ጊዜ (ባለፉት አራት ሳምንታት ውስጥ ከአስር ጊዜ በላይ	
8	ባለፉት አራት ሳምንታት ውስጥ እርስዎ ወይም ማንኛውም የቤተሰብ አባል በቂ ምግብ ስለሌለ እራት ሳይበላ ተኝቶ ነበር?	0 = አይ 1=አዎ 3 =አላውቅም	መልሱ አይ ከሆነ ፣ወደ ጥያቄ 9 ዝለል ::
8.1	ይህ ምን ያህል ጊዜ ተከሰተ?	1. አልፎ አልፎ (ባለፉት አራት ሳምንታት ውስጥ አንድ ወይም ሁለት ጊዜ) 2. አንዳንድ ጊዜ (ባለፉት አራት ሳምንታት ውስጥ ከሶስት እስከ አስር ጊዜ) 3. ብዙ ጊዜ (ባለፉት አራት ሳምንታት ውስጥ ከአስር ጊዜ በላይ)	
9	ባለፉት አራት ሳምንታት ውስጥ እርስዎ ወይም ማንኛውም የቤተሰብ አባል በቂ ምግብ ስለሌለ ምንም ሳይበሉ ቀኑን እና ማታውን ሙሉ ቆይተው ነበር?	0 = አይ 1=አዎ 3 =አላውቅም	
9.1	ይህ ምን ያህል ጊዜ ተከሰተ?	1. አልፎ አልፎ (ባለፉት አራት ሳምንታት ውስጥ አንድ ወይም ሁለት ጊዜ)	

		2. አንዳንድ ጊዜ (በለፉት አራት ሳምንታት ውስጥ ከሶስት እስከ አስር ጊዜ) 3. ብዙ ጊዜ (በለፉት አራት ሳምንታት ውስጥ ከአስር ጊዜ በላይ)	
የንጽህና ልምምድ ጥያቄዎች ለእናቶች ወይም ለእንክብካቤ ሰጪዎች			
14	ልጅዎን ከመመገብ በፊት እጅዎን በ ሳሙና ይታጠባሉ?	1. አዎ 2. አይ	
15	ለልጅዎ ምግብ ከተዘጋጀ በኋላ ወዲያውኑ ማለትም በ 2 ሰዓት ውስጥ ምግብ ያቀርባሉ?	1. አዎ 2. አይ	
16	የልጁ የመመገቢያ እቃዎች (ኩባያዎች እና ጎድጓዳ ሳህኖች) ንጹህ ናቸው?	1. አዎ (ንጹህ ከሆኑ) 2. አይ (ንጹህ ካልሆኑ)	
ክፍል 2 የእናቶች እና ህፃናት ጤና አገልግሎት አጠቃቀም			
17	የህፃኗ/ የህፃኑ እርግዚና ወቅት የቅድሜ ወሊድ ክትትል ስንት ጊዜ አድርገዋል?	1. ————— በቁጥር 2. አላውቅም	
18	የወለዱበት ቦታ የት ነው?	1. የጤና ተቋም 2. ቤት 3 አላውቅም	
19	ልጅዎ ላለፉት 6 ወራት የሻይታሚን ኤ ወስዷል	1. አዎ 2. አይ 3 አላውቅም	
21	የልጁ/ የልጅቷ ጡት የመጥባት ሁኔታ?	1 ከተወለደበት/ከተወለደችበት ጀምሮ ያልጠባ/ች	

		2 ጀምሮ/ራ ያቋረጡ/ች	
		3 ትላንትና ቀን ወይም ማታ ያልጠባ/ች	
22	ይህ መጠይቅ ከመድረሱ 2 ሳምንታት በፊት ልጅዎ ተቅማጥ ወይም ትኩሳት ነበረው?	1. አዎ 2. አይ	
23	ልጅዎ ክትባት ስንት ጊዜ ነው የወሰደው/ችው	1----- ጊዜ 2= አላውቅም	
ክፍል 3. የጨቅላ እና ትናንሽ ህፃናት አመላካቾች አመጋገብ			
24. አነስተኛ የወተት አመጋገብ ድግግሞሽ			
1	ትላንትና (የልጁ/ የልጅቷ ስም) ማንኛውንም የወተት ተዋጽኦዎችን ወስዳ/ወስዶ ነበር? ይህ የሚያጠቃልለው፡ የጨቅላ ህፃናት ወተት፣ እርጎ፣ እርጎ መጠጥ ወይም ትኩስ/ዱቄት ያለው የእንስሳት ወተት	1. አዎ 2. አይ 9 አላውቅም	ወደ ጥያቄ 25 ዝለል፣ መልሱ አይ/አላውቅም ከሆነ ::
1	የጠቀስኳቸውን የወተት ተዋጽኦዎች (የልጁ/ የልጅቷ ስም) ትናንት ስንት ጊዜ ወስዳ/ወስዶ ነበር?	1 ... ጊዜ 2 አላውቅም	

25. ዝቅተኛው የምግብ ዓይነት ትላንትና ቀን ወይም ማታ ላይ (የልጁ/ የልጅቷ ስም) _____ በልቷል / በልታለች?			
1	እንጀራ፣ ገንፎ፣ ዳቦ፣ ሩዝ፣ ፓስታ/ ድንች ወይም ሌሎች ከእህል(ጤፍ፣አጃ፣በቆሎ ወይም ገብስ) የሚዘጋጁ ምግቦች?	1. አዎ 2. አይ 9 አላውቅም	
2	ዱባ ፣ ካሮት ፣ ቲማቲም ፣ስኳር ድንች ወይም ውስጣቸው ቢጫ ወይም ቡርቱካናማ የሆኑ አትክልቶች(የበሰለ ማንጎ ወይም ፓፓያ)	1. አዎ 2. አይ 9 አላውቅም	
3	ማንኛውም ስጋ ለምሳሌ እንደ በግ፣በሬ፣ፍየል፣ዶሮ እና አሳ	1. አዎ 2. አይ 9 አላውቅም	
4	እንቁላል?	1. አዎ 2. አይ 9 አላውቅም	
5	ባቄላ፣ አተር፣ ምስር፣ ለውዝ ?	1. አዎ 2. አይ 9 አላውቅም	
6	ደማቅ አረንጓዴ ቀለም ያላቸው ቅጠላ ቅጠሎች ለምሳሌ ቆስጣ እና ጥቁር ጎመንና	1. አዎ 2. አይ	

	ሌሎች ፍራፍሬዎች ወይም አትክልቶች	9 አላውቅም	
26. አነስተኛ የምግብ ድግግሞሽ ትላንት ቤት ወይም ሌላ ቦታ ቀን ወይም ማታ (የልጁ/ የልጅቷ) ————— ወስዳ/ወስዶ ነበር?			
1	የጨቅላ ህፃን ወተት እንደ አሉላ፣ ሊጥቶሚል ወይም ሌላ ...?	1. አዎ 2. አይ 9 አላውቅም	ወደ ጥያቄ 3 ዝለል፣ መል ሱ አይ/ አላው ቅም ከሆነ።
2	ስንት ጊዜ ጠጣ?	ጊዜ	
3	እርጎ?	1. አዎ 2. አይ 9 አላውቅም	ወደ ጥያቄ 5 ዝለል፣ መል ሱ አይ/ አላው ቅም ከሆነ።
4	ስንት ጊዜ ጠጣ?	ጊዜ	

5	የእንስሳት ወተት እንደ ትኩስ፣ የታሸገ ወይም የዱቄት ወተት?	1. አዎ 2. አይ 9 አላውቅም	ወደ ጥያቄ 7 ዝለል፣ መልሱ አይ/አላውቅም ከሆነ።
6	ስንት ጊዜ ጠጣ?	ጊዜ	
7	(የልጁ/ የልጅቷ ስም) ትናንት በቀን ወይም በሌሊት ማንኛውንም ጠንካራ፣ ከፊል-ጠንካራ ወይም ለስላሳ ምግቦችን ስንት ጊዜ በልቷል / በልታለች?	7 ወይም ከዚያ በላይ አላውቅም	

የመለኪያ ውጤቶች

የልጁ/ የልጅቷ ክብደት _____ ኪ.ግ

የልጁ/ የልጅቷ ርዝመት _____ ሴ.ሜ

Principal Investigator

Curriculum Vitae: Lidetash Wolde

Personal Information

First name: Lidetash Middle name: Wolde last name: Worabo

Age: 27years Sex: Female Marital status: Single

Place of Birth: Dawro, Ethiopia

Date of Birth: 07 Jan, 1998

Nationality: Ethiopian

Language: English, Amharic, Dawrotsuwa, Wolaitatuwa, Gofatsuwa, Gamotsuwa: Speak, Read and Write

Email: lidetashw@gmail.com

Phone number (mobile): +251989913091

Home Address

Addis sub-city, Woreda 06

House number New, Addis Ababa, Ethiopia

I. Academic Qualification

1. Bsc in Public Health Officer

Period of study: September 2017 -Jul 2021

Program: Degree

Institution: Wachemo University, Hossana, Ethiopia

II. Work Experience

Graduate Assistant II

September 2021-September 2022

Department of Public Health, Wolaita Sodo University

- Supervised data collection process
- Supervised Team Training Program and CBTP
- Develop data collections instruments
- Teach undergraduate students and evaluate their researches

III. Skills:

I am proficient in basic computer, WHO-Anthro, ENA, ODK, SPSS and Epi-data software.

Data collection, Report writing

IV. Future Plans and Interests:

Upgrading my level of education to the next higher level

Being an expert on my area of study to teach my students

Conducting different researches to my community

V. Reference

1. Abera Boyamo (MPH, Assistant professor)

Assistant Professor in Epidemiology, WCU

Tel. +251923374542

E-mail: bdereje05@gmail.com

2. Tekile Ejajo

Instructor in department of health service management, WCU

Tel. +251913617231

Email: ejajotekle@gmail.com

3. Lire Lemma Tirore (Msc.in BHI)

Email: ganetlemma@gmail.com

Tel. +251916281764

